Chapter 4

John Mosesso Jr/NBII

American widgeon

Management Direction and Implementation

- Introduction
- Part One—Mason Neck Refuge Management
  - Introduction
  - General Refuge Management
  - Conducting Additional NEPA Analysis
    - Mason Neck Refuge Goals, Objectives, and Strategies
      - Detailed Objectives and Strategies to Meet Refuge Goals
- Part Two—Featherstone Refuge Management
  - Introduction
  - General Refuge Management
  - Conducting Additional NEPA Analysis
    - Featherstone Refuge Goals, Objectives, and Strategies
      - Detailed Objectives and Strategies to Meet Refuge Goals

Introduction

This chapter begins with a description of the process we used to formulate the management direction and implementation for both Mason Neck and Featherstone Refuges. Next, we present the management direction and implementation for the refuges in two parts: Part One covers Mason Neck Refuge; Part Two covers Featherstone Refuge. Parts One and Two both start with a description of actions that are required by law or regulation, have been previously approved, or that help to achieve multiple refuge goals. We also identify decisions we are not making at this time and that will require additional NEPA analysis before a final decision can be made. We conclude with the goals, objectives, and strategies for managing each refuge.

The management direction and implementation we describe in this chapter includes a set of refuge goals, objectives to achieve those goals, and a series of strategies to implement them. The array of management actions described here are those that, in our professional judgment, will best achieve that refuge's purposes, vision, and goals, and best respond to public issues.

Refuge goals are intentionally broad, descriptive statements of the desired future condition for a refuge's resources. By design, they are less quantitative and more prescriptive in defining the targets of our management. They also articulate the principal elements of refuge purposes and our vision statements, and provide a foundation for developing specific management objectives and strategies. As noted in chapter 1, developing a strategic plan to achieve the goals is the purpose for developing the CCP.

Objectives are essentially incremental steps toward achieving a goal and they further define management targets in measurable terms. They provide the basis for determining more detailed strategies, monitoring refuge accomplishments, and evaluating our success. The Service guidance in "Writing Refuge Management Goals and Objectives: A Handbook" (USFWS, 2004) recommends that objectives possess five properties to be "SMART":

1) Specific
2) Measurable
3) Achievable
4) Results-oriented
5) Time-fixed

A rationale accompanies each objective to explain its context and why we think it is important. We will use the objectives to write refuge step-down plans, which we describe later in this chapter.

The strategies for each objective are the specific or combined actions, tools, or techniques we may employ to achieve an objective. The list of strategies under each objective identifies the potential suite of actions we may implement. We will evaluate most of them further as to how, when, and where they should be implemented in refuge step-down plans. We will measure our success, in part, by how well our strategies achieve our objectives and goals.

We also list biological monitoring elements which are recommended ways to measure our success with respect to achieving our biological program objectives. The results of this monitoring may also trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives.

Part One—Mason Neck Refuge Management

Introduction

We believe the management goals, objectives, and strategies described below provide the best combination of actions to meet the Refuge System mission and policies, meet refuge purposes and goals, and to address public issues. We plan to enhance and expand our partnerships to help achieve priority work and obtain the best resource information available. Our management focus will be on those actions that protect and enhance the refuge's tidal marsh and forest habitats, with emphasis on benefiting bald eagles, forest-dependent migratory songbirds, waterfowl, and wading and waterbirds, such as great blue heron

As noted above, our highest priority is to protect and enhance the diversity, integrity, and health of the refuge's Great Marsh and the mature hardwood-mixed forest habitats to support Federal trust resources and species of conservation concern. We will also work with partners to develop shoreline protection measures and address climate change impacts. We will develop a Habitat Management Plan (HMP) to outline the detailed, site-specific prescriptions and strategies we intend to employ in those habitats to benefit a broad array of wildlife, including our focal species, amphibians and reptiles, fish and other aquatic resources, and other native wildlife of conservation concern. The HMP will also include detailed plans to improve Little Marsh impoundment and other refuge wetlands. We will also improve our program to treat invasive species. Our mapping, inventorying, and monitoring program of wildlife and habitats will increase to help assist us in measuring our successes.

We will enhance our visitor services program by improving our infrastructure and the quality of our programs, and offering new opportunities. For example, we will improve our existing parking facilities and trails, and create new trails and observation platforms on Sycamore and Treestand Roads. These actions will provide additional opportunities for wildlife observation, photography, and interpretation. Once we have resources in place, we will also offer a new youth turkey hunt and consider expanding our deer hunt. Our outreach to the local community will improve through increased Service visibility, an improved volunteer program, and enhanced visitor services programs and services.

We will manage the refuge as part of the Refuge Complex from new headquarters on Occoquan Bay Refuge once constructed. The approved Refuge Complex staffing chart identifies a total of 16 positions; an increase of 10 positions from our current staffing levels. We have identified the vacant positions we recommend in this CCP which we believe are key to implementing this plan's goals and objectives. They include wildlife biologists and maintenance, law enforcement, and visitor services staff.

General Refuge Management

There are some actions we propose to take in managing Mason Neck Refuge over the next 15 years that are required by law or policy, or represent actions that have undergone previous NEPA analysis, public review, agency review, and approval. Others may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge's purpose, vision, and goals.

It is important here to reemphasize that CCPs provide long-term guidance for management decisions through goals, objectives, and strategies. They represent our best estimate of future needs. This CCP details program levels and activities that are substantially above current budget allocations and, as such, should be

viewed as strategic in nature. Our budgets are determined annually by Congress and distributed through our Washington and Regional office before arriving at field stations. In summary, the actions proposed in this CCP represent our strategic vision for the future. Final CCPs do not constitute a Service commitment for staffing increases, funding for operations and maintenance, or future land acquisition. Implementation must be adjusted annually given the reality of budgets, staffing, and unforeseen critical priorities.

All of the following actions, which we discuss in more detail below, are current practices or policies that will continue:

- Using an adaptive management approach, where appropriate
- Consolidating and improving refuge lands and facilities
- Staffing and refuge administration
- Coordinating with refuge partners, Friends of Potomac River Refuges, and the Mason Neck Refuge community
- Protecting federally listed and recently de-listed species
- Managing invasive plants
- Controlling pest animals
- Monitoring and abating wildlife diseases
- Managing forest health and condition
- Supporting research and investigations
- Developing refuge step-down plans
- Distributing Refuge Revenue Sharing payments to Fairfax County
- Protecting cultural resources
- Supporting wildlife-dependent recreational uses
- Continuing a fishing closure
- Conducting appropriateness and compatibility determinations
- Conducting additional NEPA analysis

Using an Adaptive Management Approach

We will employ an adaptive management approach for improving resource management by learning from management outcomes. In 2007, Secretary Kempthorne issued Secretarial Order No. 3270 to provide guidance on policy and procedures for implementing adaptive management in Departmental agencies. In response to that order, an intradepartmental working group developed a technical guidebook to assist managers and practitioners: "Adaptive Management: The U.S. Department of Interior, Technical Guide." It defines adaptive management, the conditions under which we should consider it, the process for implementing it, and evaluating its effectiveness (Williams et al., 2007). You may view the technical guidebook at: *http://www.doi.gov/initiatives/AdaptiveManagement/documents.html* (accessed June 2011).

The guidebook provides the following operational definition for adaptive management:

> *Adaptive management is a decision process that promotes flexible decisionmaking that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increase scientific knowledge, and reduces tensions among stakeholders.*

This definition gives special emphasis to the uncertainty about management impacts, iterative learning to reduce uncertainty, and improved management as a result of learning. At the refuge level, our monitoring of management actions, outcomes, and key resources will be very important to implementing an adaptive management process. Our invasive species and integrated pest management activities are examples of refuge programs or activities where an adaptive management approach may be implemented to ensure we are protecting the health and integrity of our habitats. Responding to climate change impacts will also require an adaptive management approach because of the uncertainty as to how, when, and where habitats and species will respond to those impacts.

The refuge manager will be responsible for changing management actions and strategies if they do not produce the desired conditions. Significant changes from what we present in our final CCP may warrant additional NEPA analysis and public comment. Minor changes will not, but we will document them in our project evaluation or annual reports. Implementing an adaptive management approach supports all the goals of the refuge.

Consolidating and Improving Refuge Lands and Facilities

Consolidating Refuge Lands

We will continue discussions with the NVRPA, Fairfax County, and elected officials about options for consolidating Service fee ownership of refuge lands. Presently, 789 of the refuge's 2,277 acres are under a 60-year lease agreement with NVRPA that began in 1982; 31 years remain on that lease which will expire in 2042. Acquiring this land in fee would provide the Service maximum management flexibility. This would be especially desirable when implementing forest management or wetlands restoration projects.

Building a New Refuge Headquarters/Visitor Center

We will continue to pursue funding to build a new Refuge Complex headquarters and visitor center on Occoquan Bay Refuge. Staff, equipment, interpretive materials, and exhibits at this facility would support the outreach, interpretive, and educational objectives identified for Mason Neck Refuge. We have completed a separate EA for locating and developing this facility (USFWS, 2009a).

Maintaining Visitor Facilities

We will continue to make incremental progress in maintaining and upgrading existing visitor services facilities, such as interpretive and informational signs and parking areas. We will also continue to identify and remove those structures that have no useful purpose or that pose safety hazards. Our objective is to continue to maintain our facilities to Service standards to keep them safe, functional, and attractive.

Providing Refuge Housing
We will pursue options for providing refuge staff housing onsite (see map 4.1). Affordable housing in the area is limited and refuge staff must often travel extended distances to find housing they can reasonable afford. It has been very challenging to find seasonal or temporary staff under these circumstances. Travel time between the refuges within the Refuge Complex during the workday can also be problematic and inefficient. Currently, due to traffic congestion on U.S. Route 1, refuge staff can spend over one hour commuting between refuges less than 15 miles apart. The resulting travel time between home and work, or between refuges, also decreases the Service's ability to respond to incidents or emergencies. Having housing located near the refuge would

- increase resource and visitor protection;
- provide a Service presence in the area, even when the refuge is closed;
- promote greater awareness of the refuge and its resources by having an employee in the local community conducting outreach, both planned and opportunistic;
- provide affordable housing for Service employees; and
- provide short-term housing for temporary staff, researchers, interns, and employees on detail.

Our provisional location for the housing is on refuge lands adjacent to the entrance road on uplands east of Kane's Creek close to the refuge boundary. We will conduct archaeological and threatened and endangered species surveys and water percolation tests for a septic system before a final location is selected. The building will be a two-story duplex set back from the road so as to be less visible to refuge visitors. It will have a garage and an approximately 50 foot length driveway, and be serviced by well-water and a septic field. The construction of the building will disturb no more than 1 acre of land.

Also on refuge lands, we will continue to pursue installing a pad and facilities hookups for a recreational vehicle (RV) to be used as seasonal temporary quarters for refuge volunteers. It will be located at the Mason Neck Refuge maintenance facility, or other feasible location on the refuge where infrastructure could be placed without diminishing resource values or public activities.

Ovenbird

Bill Thompson

We will obtain all Federal and State reviews and permits required for these construction activities on refuge lands.

Best Management Practices for Construction and Maintenance Activities
We will implement best management practices for all construction and maintenance activities to the extent applicable and practicable on refuge lands. Recommended practices include, but are not limited to, the following:

- Operate machinery and construction vehicles outside of stream-beds and wetlands; use synthetic mats when in-stream work is unavoidable.

Map 4.1. Mason Neck Refuge Existing and Planned Public Use Features

- Preserve the top 12 inches of material removed from wetlands for use as wetland seed and root-stock in the excavated area.

- Design erosion and sedimentation controls in accordance with the most current edition of the "Virginia Erosion and Sediment Control Handbook". These controls should be in place prior to clearing and grading, and maintained in good working order to minimize impacts to State waters. The controls should remain in place until the area is stabilized.

- Place heavy equipment, located in temporarily impacted wetland areas, on mats, geotextile fabric, or use other suitable measures to minimize soil disturbance, to the maximum extent practicable.

- Restore all temporarily disturbed wetland areas to pre-construction conditions and plant or seed with appropriate wetlands vegetation in accordance with the cover type (emergent, scrub-shrub, or forested). The applicant should take all appropriate measures to promote revegetation of these areas. Stabilization and restoration efforts should occur immediately after the temporary disturbance of each wetland area instead of waiting until the entire project has been completed.

- Place all materials which are temporarily stockpiled in wetlands, designated for use for the immediate stabilization of wetlands, on mats or geotextile fabric in order to prevent entry in State waters. These materials should be managed in a manner that prevents leachates from entering State waters and must be entirely removed within 30 days following completion of that construction activity. The disturbed areas should be returned to their original contours and stabilized within 30 days following removal of the stockpiles, and restored to the original vegetated state.

- All non-impacted surface waters within the project or right-of-way limits that are within 50 feet of any clearing, grading, or filling activities should be clearly flagged or marked for the life of the construction activity within that area. The project proponent should notify all contractors that these marked areas are surface waters where no activities are to occur. Measures should be employed to prevent spills of fuels or lubricants into State waters.

- Minimize natural area loss on new and rehabilitated federal facilities.

- Adopt low-impact development and best management technologies for stormwater, sediment and erosion control, and reduces impervious surfaces.

- Consider construction design consistent with the "Conservation Landscaping and Bay-Scapes for Federal Land Managers Guide."

- Use, where possible, water or chemicals for fugitive dust control.

- Install and use hoods, fans, and fabric filters to enclose and vent the handling of dusty materials.

- Cover open equipment while conveying materials.

- Promptly remove spilled or tracked dirt or other materials from paved streets and remove dried sediments resulting from soil erosion.

- Reduce, reuse, and recycle all solid wastes generated.

- Minimize and properly handle generated hazardous wastes.

Staffing and Refuge Administration

Permanent Staffing and Operational Budgets

Our objective will continue to be to sustain annual funding and staffing levels that allow us to achieve our refuge purposes, as interpreted by the goals, objectives, and strategies in this CCP. Many of our most visible projects since refuge establishment were achieved through special project or "earmarked" funds that typically have a 1 to 2-year duration. While these funds are very important to us, they are limited in their flexibility since they typically cannot be used for any other priority project that may arise.

In response to Refuge System operational funding declines nationwide, a Regional Work Force Plan was developed in 2006 to support a new base budget approach. The goal was to have a maximum of 75 percent of a refuge complex's budget cover salaries and fixed costs, while the remaining 25 percent or more will be operations dollars. The intent of this strategy is to improve the refuge manager's capability to do the highest priority project work and not have the vast majority of a refuge's budget tied up in inflexible, fixed costs. Unfortunately, in a stable or declining budget environment, this may also have implications on the level of permanent staffing.

Within the guidelines of the new base budget approach, we will maintain, at a minimum, the six current full-time staff positions for the Refuge Complex, which include a refuge manager, assistant refuge manager, visitor services specialist, law enforcement officer, administrative assistant, and maintenance worker. Staff will continue to be shared within the Refuge Complex and will be assigned tasks at any of the three refuges based on the refuge manager's determination of how resources should be distributed to accomplish priorities. This CCP proposes an increase in staff based on the national staffing model developed for refuges by the Service in 2008. See our discussion that follows on "Implementation of the National Staffing Model."

Implementing the National Staffing Model

In 2008, the Assistant Director of the Refuge System convened a team to develop a national staffing model that would more effectively represent what is needed to operate and manage the diversity of field stations in the Refuge System. The team was directed to develop a model that would take into account the variety of refuge purposes in the Refuge System, contribute to the Refuge System mission, and comply with the 1997 Refuge Improvement Act and other laws, regulations, and policies. The team was also directed to build upon information and lessons learned from previous Systemwide staffing modeling efforts.

The model developed considers 15 factors which drive refuge workloads, including consideration of the amount of acres under management and the level of intensity of management. For example, such things as the amount of invasive species management, endangered species management and monitoring, active habitat management and biological monitoring, wilderness management, visitation and visitor services programs, volunteer programming, Friends Group coordination, maintenance and facilities management, aircraft or ocean travel needs, subsistence uses, and law enforcement are factors evaluated. The model identifies a total number of full-time equivalents (FTEs) a refuge should have, but does not dictate what the specific positions should be, nor does it determine a priority order for filling them. These more detailed decisions are made by the Regional Director, after advisement from the Assistant Regional Director for the Refuge System and recommendations from respective refuge managers.

The national staffing model recommends 16 positions for the Potomac River Refuge Complex. We have proposed which specific positions are recommended to fill out 16 positions. We present the recommended staff in appendix E "Staffing Chart." We also identify our recommended priority order for acquiring new staff in appendix C "Refuge Operations Needs System (RONS) and Service Asset Maintenance Management System (SAMMS)."

Refuge Operating Hours
We will continue to open the refuge for public use year-round during refuge hours of operation. These hours of operation are typically 7:00 am to 7:00 pm from April 1 to September 30 and 7:00 am to 5:00 pm from October 1 to March 31. We temporarily close the refuge to all but hunters during scheduled refuge hunt days. However, the refuge manager does have the authority to issue a special use permit to allow access outside those periods. For example, we may permit access for research personnel or hunters at different times, or allow organized groups to conduct nocturnal activities, such as wildlife observation, environmental educational, and interpretive programs. To insure visitor safety and protect refuge resources, the refuge manager also has the authority to close the refuge at any time.

Coordinating with Partners, Friends of Potomac River Refuges, and the Mason Neck Refuge Community

Partners
We will continue to maintain active involvement in the Mason Neck Land Managers Group (Managers Group). The Managers Group is a partnership among all public land management agencies on the Mason Neck Peninsula including the refuge, Mason Neck State Park, the BLM, Gunston Hall, and the Pohick Bay Regional Park. It is designed to achieve habitat and public use management objectives that benefit public lands beyond the refuge boundary.

As part of the Managers Group, we will continue to

- communicate and coordinate regularly with the other agencies to discuss common goals, issues, and concerns, share technical information, and identify opportunities for cooperative management;
- rotate responsibility for hosting quarterly managers meetings;
- pursue formal memorandums of understanding(MOU)/memorandums of agreement (MOA) with these agencies, where warranted, to facilitate sharing of resources; and
- maintain the existing MOU with BLM to share in law enforcement.

In addition to the Managers Group, we will continue to evaluate opportunities for new partnerships with conservation organizations, educators, research and academic institutions, and other State and Federal agencies who share similar missions and goals. We will develop formal MOU/MOAs or cooperative agreements, as warranted, to facilitate the sharing of resources and implementation of programs.

With existing and future partners, we will make a greater effort to highlight our programs, opportunities, and successes through use of media links (e.g., Web site) and the development of quality outreach materials with clear and consistent messages. Many of our objectives that follow in this chapter also identify key partners working with us on specific programs.

Friends of Potomac River Refuges
We will continue to look for opportunities to enhance our relationship with the Friends of Potomac River Refuges. We will also encourage them to work with other local citizens' groups as an extension of our community outreach program. We will work closely with the Friends Group to

- implement their strategic plan;
- conduct monthly information and strategy meetings;
- protect federally listed and recently de-listed species;
- contribute information to their newsletter and Web site; and
- support their efforts at sponsoring community events and programs.

Protecting Federally Listed and Recently De-listed Species

The bald eagle was removed from the Federal list of threatened and endangered species in 2007. However, we will continue to protect nesting bald eagles and their habitat on the refuge because their protection was the primary purpose for establishing the refuge. Furthermore, the bald eagle remains a State-listed threatened species in Virginia and continues to be protected federally under the MBTA and the Eagle Act. There are currently three nesting bald eagle pairs on the refuge, and we will continue to monitor the nests and breeding activities and prohibit the public from disturbing them.

The Service has identified two federally listed plants in Fairfax County which have not been documented but may be present on Mason Neck Refuge: sensitive joint-vetch (threatened) and small whorled pogonia (threatened). We will continue to survey for these plants wherever we propose any ground disturbing activities on the refuge. If located, we will work with the respective species' Recovery Team, VNHP, and other experts to develop plans to protect them.

Managing Invasive Plants

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. For the purposes of this discussion, we use the definition of invasive species contained in the Service Manual (620 FW 1.4E): "Invasive species are alien species whose introduction does or is likely to cause economic or environmental harm, or harm to human health. Alien species, or non-indigenous species, are species that are not native to a particular ecosystem. We are prohibited by Executive Order, law, and policy from authorizing, funding, or carrying out actions that are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere."

The unchecked spread of invasive plants threatens the biological diversity, integrity, and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. Over the past several decades, government agencies, conservation organizations, and the general public have become more acutely aware of the negative effects of invasive species. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (National Invasive Species Management Strategy Team 2003), *Silent Invasion—A Call to Action* by the National Wildlife Refuge Association (2002), and *Plant Invaders of Mid-Atlantic Natural Areas* by the Service and the National Park Service (2002). New information and updates on recent advances in control techniques are continually provided through the Refuge System biological discussion database and relevant workshops. There are also more funding sources, both within the Service's budget and through competitive grants, to conduct inventories and control programs.

Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G). These actions, as stated in the Service Manual, serve to define our general strategies on the refuge:

1) Manage invasive species to improve or stabilize biotic communities to minimize unacceptable change to ecosystem structure and function and prevent new and expanded infestations of invasive species.

2) Conduct refuge habitat management activities to prevent, control, or eradicate invasive species using techniques described through an Integrated Pest Management Plan (IPM), or other similar management plan, which comprehensively evaluates all potential integrated management options, including defining threshold/risk levels that will initiate the implementation of proposed management actions.

3) Evaluate native habitat management activities with respect to their potential to accidentally introduce or increase the spread of invasive species and modify our habitat management operations to prevent increasing invasive species populations.

4) Conduct Refuge Complex integrated pest management planning to address the abilities and limitations of potential techniques including chemical, biological, mechanical, and cultural techniques.

5) Manage invasive species on refuges under the guidance of the National Strategy for Invasive Species Management and within the context of applicable policy.

6) Continue treatment of the most problematic species as funding and staffing permit.

7) Maintain early-detection/early-response readiness regarding new invasions.

8) Remove parent sources of highly invasive species (species that are high seed producers, or vigorous rhizome producers) from along edges of management units.

9) Maintain accessibility to affected areas for control and monitoring.

10) Continue and increase efforts to involve the community in promoting awareness of invasive species issues, and to seek assistance for control programs on and off the refuge.

In addition to these general strategies, we will continue to refine our control program to address the most critical problems first. Further, our priorities may be adjusted to reflect changes in Regional Service priorities, and/or based on new information or resource availability. We will identify those priorities and treatment needs in an IPM Plan for the Refuge Complex that will specify the tools, procedures, and mitigation measures we will use to address invasive plant problems on all three refuges. Until the plan is finalized, we will track the spread of invasive plants on the refuges and address their control as warranted. Currently, our particular concern on Mason Neck Refuge is the spread of mile-a-minute and Japanese stiltgrass. Other problem plants we are tracking include beefsteak plant, tree-of-heaven, Japanese barberry, Japanese honeysuckle, and Japanese wisteria *(Wisteria floribunda* (Willd.) DC.)

We will continue to treat invasive plants as needed using mechanical means (e.g. mowing or trimming) and hand-pulling, as well as herbicides. We will only use herbicides approved by the Regional Contaminants Coordinator and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval process. The extent and frequency of approved herbicide use will depend on funding.

Controlling Pest Animals

At times, native plants and animals interfere with management objectives. The Refuge Manual (7 RM 14.4A) defines a pest as "Any terrestrial or aquatic plant or animal which interferes, or threatens to interfere, at an unacceptable level, with the attainment of refuge objectives or which poses a threat to human health." That definition could include the invasive species defined above, but in this section, we describe some situations involving native species and under what conditions we would initiate control.

In controlling pests, whether invasive or native species, we will continue to use an integrated approach. The Refuge Manual (7 RM 14.4C) defines integrated pest management as "a dynamic approach to pest management which utilizes a full knowledge of a pest problem through an understanding of the ecology of the pest and ecologically related organisms and through continuous monitoring of their populations. Once an acceptable level of pest damage is determined, control programs are carefully designed using a combination of compatible techniques to limit damage to that level."

An integrated approach uses various methods, including natural, biological, manual, mechanical, and chemical controls. Some examples and potential remedies of pest management follow.

Problem: Deer browsing on newly planted tree seedlings causing unacceptable levels of mortality

Potential solutions: Use tree shelters or plant clover in advance of tree planting to provide alternative food source. This will be a site-specific strategy to protect a specific valued resource at one location. Our general strategy for keeping deer populations in balance with overall refuge habitat conditions is through public hunting.

Problem: Beaver girdling large trees adjacent to public use facilities, potentially causing injury to visitors or damaging facilities from falling trees and branches

Potential solutions: Wrap trees with hardware cloth to prevent girdling. Temporarily employ State-licensed trappers to remove individuals from the population from selected locations. Remove dead trees before they fall. Also, see discussion below about furbearers and the discussion on general strategies.

Problem: Beaver damming and flooding creeks or other drainage areas, potentially killing native trees or flooding roads, preventing access or threatening public safety, and altering tidal flow

Potential solutions: Remove individual problem beavers by trapping and shooting.

Problem: Mute swans are competing with native waterfowl and damaging protected wetland areas

Potential solution: Work with Federal and State partners (e.g., VDGIF) to capture and remove mute swans. The Service goal is zero productivity for mute swan in the Region due to the swan's negative impact on native waterfowl and their habitats.

Problem: Resident Canada geese increasing in number and using protected wetland areas and grazing and depositing manure on Little Marsh dike and other grassy areas and on the adjacent Mason Neck State Park.

Potential solution: Work with Federal and State partners (e.g., VDGIF) to capture and remove resident Canada geese.

Problem: Furbearers, such as raccoons *(Procyon lotor)*, causing unacceptable levels of predation on nesting birds.

Potential solutions: If nest boxes are in use, construct predator guards. Employ mechanical removal or herbicides on invasive vines, such as Japanese

honeysuckle, that facilitate climbing predator's access to nests. Use a State-licensed trapper to remove individuals from the population in selected areas, if necessary.

We do not intend to initiate a public or recreational trapping program at this time. Trapping is considered a commercial activity and must meet a higher standard of compatibility than priority wildlife-dependent public recreational uses or other non-commercial uses. We will reconsider our position if future situations arise in which predation, habitat loss, or disease is severe, and we determine public trapping to be an effective, essential element in managing them. Until that is necessary, we will only use trapping on a case-by-case basis to help alleviate a particular problem. Trapping will only be conducted by refuge staff, their agents, or contractors, to achieve a specific management objective. As such, it will be considered a management or administrative activity and not subject to compatibility review.

We will continue to use the following general strategies in pest management:

1) Determine the need for site-specific control based on the potential to affect our management objectives for a given area. Although we will employ an adaptive management strategy, we also expect the lethal control or removal of individual animals to be the exception rather than the rule. Unfortunately, to establish general thresholds for that action is difficult. Instead, we will determine our solution by each site. For example, in some areas, beaver activity (e.g., ponding, flooding, tree-girdling, tree-falling, etc.) enhances our management objectives for wildlife and habitats. In other areas, extensive beaver activity (e.g., tree-felling, trees dying from flooding, blockage of water control structures, etc.), could begin to affect habitat significantly for migratory birds and other sensitive species. In summary, we will base our beaver management actions on the extent and impact of damage, and not on the number of beavers present. We will focus on how they affect sensitive resources, neighboring marshes and fields, refuge infrastructure, and accessibility. When non-lethal techniques are not feasible, or they are no longer a viable remedy, we will consider targeted trapping or shooting by refuge staff, their agents, or contractor.

2) Employ integrated pest management techniques, including those described in the examples above, when a species is having a significant impact on an area resulting in major habitat replacement and loss of valuable canopy trees, such as oaks.

3) Monitor results to ensure that pests do not exceed acceptable levels.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director of the Service or the Secretary. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized

2) To provide for early detection and identification of disease mortality when it occurs

3) To minimize losses of wildlife from disease outbreaks

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been

given to those diseases that are transmitted through wildlife to humans. For example, Lyme disease transmitted by ticks and West Nile virus transmitted by mosquitoes.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is chronic wasting disease (CWD). CWD attacks the brain and spinal cord of deer, elk, and moose, and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility, and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia, and Canada. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk (Cervus canadensis), and moose (Alces alces). There is also no evidence that any human has ever been infected with chronic wasting disease.

The VDGIF is conducting active surveillance for CWD during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF commenced Statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth. In January 2010, the VDGIF confirmed the first case of CWD in Virginia *(http://www.dgif.virginia.gov/wildlife/diseases/cwd/;* accessed June 2011). It was detected in a white-tailed deer killed by a hunter in Frederick County, near the West Virginia State line. VDGIF recommends that people take precautions to avoid exposure to animals infected with chronic wasting disease. Specifically, they recommend not consuming meat from any deer that appears abnormal, sick, or is known to be infected with CWD. They also recommend wearing gloves when dressing and boning deer meat. For more detailed information on VDGIF's response to chronic wasting disease, you can access their Chronic Wasting Disease Response Plan at: *http://www.dgif.virginia.gov/cwd* (accessed June 2011). We also developed a CWD plan for the Refuge Complex in 2006 and will continue to communicate and coordinate with VDGIF to monitor for the presence of the disease on and near the refuge.

Managing Forest Health and Condition

In addition to wildlife diseases, we will continue to be attentive to diseases and insect pests that affect forest health and condition. Since we place high value on hardwood forests on the refuge, diseases and insects that affect oaks are of special concern. Oaks in the U.S. are affected by more than 80 documented insects and diseases, with escalating international trade likely to introduce new pests. Impacts of these pests range from minor defoliation to rapid mortality. In some years, pests cause the loss of a major portion of the acorn crop, impeding oak regeneration. A few pests have altered, or may alter, eastern U.S. oak forests on a broad scale. For example, the spread of the introduced gypsy moth, a defoliator, has been aided in the last few decades by the accidental transport of egg masses by humans.

The emerald ash borer is another forest pest of increasing concern in the region. This beetle affects all ash species in North American. The canopy of infested trees will thin and die back above infested portions as the borer destroys the water and nutrient conducting tissues under the bark. One-third to one-half of

the branches may die in one year. Most of the canopy will be dead within 2 years of when symptoms are first observed.

General strategies for pest and disease prevention and control include the following:

1) Conduct pest and disease surveillance in conjunction with other field work.

2) Monitor forests and other habitats for indicators of increased occurrence of pests or disease. For example, note changes in flowering or fruiting phenology, physical damage, decay, weakening, sudden death, particularly of canopy and source trees of major host species, and note changes in wildlife use of habitats such as the absence of breeding birds that used to be seen regularly.

3) Cooperate with Federal and State agencies, particularly VDGIF and U.S. Department of Agriculture-Forest Service (USDA-FS) in conducting surveillance, providing access for sampling, and following protocols in the event of an outbreak.

4) Follow protocols outlined in national, State, and refuge-specific disease prevention and control plans.

In 2009, the VDF completed a Forest Health and Condition Inventory and Assessment of Mason Neck Refuge. Overall, they determined that the Mason Neck Refuge's hardwood forest was unhealthy, suffering from a lack of regeneration, missing an understory of shrubs and herbaceous plants, and was considerably "overstocked." The lack of hardwood regeneration, shrub layer, and herbaceous plants is likely due to overbrowsing from high deer populations. The VDF report included recommendations for improving forest health and habitat quality for bald eagles and forest interior dependent birds. Specific recommendations we plan to adopt are highlighted as strategies under each objective.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

1) To promote new information and improve the basis for, and quality of, refuge and other Service management decisions

2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general

3) To provide the opportunity for students and others to learn the principles of field research

In 2006, the Service Manual (603 FW 1.10D (4)) provided supplemental guidance on the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

All research conducted on the refuge by others must be determined in writing by the refuge manager to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 3, we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions.
- Participate in appropriate multi-refuge studies conducted in partnership with USGS.
- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work.
- Pursue peer-reviewed publications of research, and/or ensure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation plans, such as the ACJV.

All researchers will be required to submit detailed research proposals following the guidelines established by Service policy and refuge staff. Special use permits will also identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other interim and final reports. All publications will acknowledge the Service and the role of Service staff as key partners in funding and/or operations. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, VNHP, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally, with these reviewers, and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Developing Refuge Step-down Plans

Service planning policy identifies 25 step-down plans that may be applicable on any given refuge. We have identified those that are most relevant to this planning process and have prioritized the completion of those plans yet to be developed. We will modify and update plans as new information is available to keep each plan relevant. All plans completed are incorporated by reference and their implementation assumed in this CCP. Completion of step-down plans supports all refuge goals.

Refuge Complexwide Plans
We will continue to complete Refuge Complex step-down plans according to the following schedule, with details on specific refuges incorporated in them:

- Chronic Wasting Disease Plan (completed 2006)
- Avian Influenza Plan (completed 2006)
- Law Enforcement Plan (in preparation; high priority)
- Safety Plan (updated annually)
- Emergency Action Plan (updated annually)
- Continuity of Operations Plan (updated annually)
- Hazard Communications Plan (updated annually)
- Hurricane Plan (updated annually)
- Fire Prevention Plan (updated annually)
- Integrated Pest Management Plan (moderate priority)

Refuge-specific Plans
The following are refuge-specific plans developed to address the specific conditions and requirements that pertain to Mason Neck Refuge. The priorities for completing the refuge plans are noted below.

- Fire Management Plan (FMP) (completed in 2004; planned for update)
- Habitat Management Plan (HMP) (highest priority; to be completed after CCP approval)
- Visitor Services Plan (VSP) (high priority)
- Inventory and Monitoring Plan (IMP) (moderate priority; dependent on completing HMP)
- Sign Plan (moderate priority)

Distributing Refuge Revenue Sharing Payments

As described in chapter 3, we pay Fairfax County refuge revenue sharing payments based on the acreage and the appraised value of Service fee-owned refuge lands. These annual payments are calculated by a formula determined by, and with funds appropriated by, Congress and authorized by the Refuge Revenue Sharing Act (16 U.S.C. § 715s). We will continue those payments in accordance with the law, commensurate with changes in the appraised market value of refuge lands or new appropriation levels dictated by Congress.

Protecting Cultural Resources

As a Federal land management agency, we are entrusted with the responsibility to locate and protect cultural resources, including archaeological sites and historic structures that are eligible for the National Register of Historic Places. This applies not only to resources that are located on refuge lands, but also those on lands affected by refuge activities, as well as any museum properties. There are many recorded historical and archaeological sites within the refuge area. Considering the refuge's location on the tidal Potomac River, it is likely that additional sites of various periods will be identified in the future. Appendix F includes an overview of refuge cultural resources.

During the release of the public draft CCP/EA, we consulted with the Virginia State Historic Preservation Officer (SHPO) regarding our proposed cultural resource management. In their response, the Virginia SHPO stated they fully support our cultural resource management program and agree it supports and fulfills the Service's stewardship responsibilities under Section 110 of the National Historic Preservation Act (Eaton 2011 personal communication). We will continue to conduct evaluations of the potential for refuge projects

to impact archaeological and historical resources and to consult with our regional archaeologist and Virginia SHPO, as appropriate. This will be especially important for those projects that include moving or displacing soil, as preservation in place is our preferred treatment for archaeological sites. A pre-project evaluation of activities will ensure we comply with Section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to any surveys and reviews, we will seek to minimize adverse impacts to eligible archaeological sites through limiting public access and monitoring by law enforcement officials.

We also plan to work with State and local historical societies and preservation offices to interpret cultural resources on the refuge and to explain the importance of protection and preservation of those resources.

Supporting Wildlife-dependent Recreational Uses

The 1997 Refuge Improvement Act designated six wildlife-dependent priority public uses on national wildlife refuges: hunting, recreational fishing, wildlife observation, wildlife photography, environmental education, and interpretation. Per the General Guidelines for Wildlife-dependent Recreation, Fish and Wildlife Service Manual (605 FW 1), we will strive to ensure any wildlife-dependent recreation program

1) promotes safety of participants, other visitors, and facilities;

2) promotes compliance with applicable laws and regulations and responsible behavior;

3) minimizes or eliminates conflict with fish and wildlife population or habitat goals or objectives in an approved plan;

4) minimizes or eliminates conflicts with other compatible, wildlife-dependent recreation;

5) minimizes conflicts with neighboring landowners;

6) promotes accessibility and availability to a broad spectrum of the American people;

7) promotes resource stewardship and conservation;

8) promotes public understanding and increases public appreciation of America's natural resources and our role in managing and conserving these resources;

9) provides reliable/reasonable opportunities to experience wildlife;

10) uses facilities that are accessible to people and blend into the natural setting; and

11) uses visitor satisfaction to help define and evaluate programs.

In 2005, the Regional Visitor Services Review Team identified priority wildlife-dependent public use programs of emphasis for each refuge. They identified wildlife observation and interpretation as the emphasis for Mason Neck Refuge. This determination was based on careful consideration of the refuge's natural resources, existing staff, operational funds, existing and potential facilities, and which programs we would be most effective in providing "quality" opportunities for visitors. While all of the priority public uses are important, and all but

fishing are offered on this refuge (see discussion below), wildlife observation and interpretation will receive greater emphasis when prioritizing projects and the distribution of refuge resources. As always, we look to our conservation partners, as well as the Friends of Potomac River Refuges and volunteers, to help develop and assist with all refuge public use programs.

Continuing a Fishing Closure at Mason Neck Refuge

Mason Neck Refuge has never been open to fishing and will continue to be closed to this use. There are several reasons for this. We are concerned that anglers walking along the refuge shoreline have the potential to disturb nesting and wintering bald eagles, waterbirds, and waterfowl. We are also concerned with trampling of sensitive tidal marsh vegetation and contributing to shoreline erosion. There are also areas on the shoreline with high, eroding banks where safety is a concern. In summary, there are no areas along the refuge shoreline where we could offer a fishing opportunity and not be concerned with resource damage, wildlife disturbance, or safety. We will continue to direct people to the adjacent State Park for fishing.

Conducting Appropriateness and Compatibility Determinations

Chapter 1 describes the requirements for appropriateness and compatibility determinations. Appendix B includes appropriateness and compatibility determinations to support the activities in this chapter. We will only allow activities determined appropriate and compatible to meet or facilitate refuge purposes, goals, and objectives.

Activities Not Allowed
We have received requests for non-priority, non-wildlife dependent activities that have never been allowed on Mason Neck Refuge. Activities evaluated by the refuge manager and determined not to be appropriate on refuge lands include the following:

- Taking of native plants, berry picking, and mushroom harvesting
- Jogging
- Horseback riding
- Picnicking
- Biking off of designated routes
- Swimming and sunbathing
- Non-wildlife-dependent group gatherings (e.g. weddings, family reunions, and other similar parties)
- Geo-caching (a “treasure-hunting” game using global positioning system (GPS) devices

Appendix B documents the refuge manager’s decision on their appropriateness. Most of these activities are sufficiently provided nearby on other ownerships, so the lack of access on the refuge does not eliminate the opportunity in the area. According to Service policy 603 FW 1, if the refuge manager determines a use is not appropriate, it can be denied without determining compatibility.

Another request from local residents for a proposed public trail system is in development on the Mason Neck Peninsula. The proposed plans indicate that part of this trail system would terminate at the trailhead parking area for the refuge’s Great Marsh Trail. This proposed trail would be multi-use and allow activities

prohibited on the Great Marsh Trail such as bike riding and rollerblading. Given the preliminarily information provided by proponents of the trail, we have been disinclined to allow it on the refuge until the following concerns are addressed.

First, some of the uses allowed on the proposed tail are not compatible and would conflict with users on the Great Marsh Trail. Some of the uses on the public trail are not wildlife-dependent uses and are not necessary to support priority public uses on the refuge. User conflicts may also decrease the enjoyment of refuge visitors engaged in wildlife-dependent use of the Great Marsh Trail. We do not feel that terminating a public trail that allows incompatible uses at a refuge trailhead will support any refuge purpose, objective, or goal and will not benefit the natural or cultural resources present on the refuge.

Secondly, it is predicted that some individuals using the public trail system will park in the Great Marsh Trailhead parking lot, thus decreasing the amount of parking available for refuge visitors engaged in priority public uses. This could also result in increased use of other refuge facilities by non-refuge users, such as restrooms and trash receptacles. The refuge would incur the costs of increased maintenance of these facilities. We also expect an increase in instances of prohibited uses (e.g. bicycling, rollerblading, jogging) on the Great Marsh Trail by visitors that do not differentiate between the refuge trail and the proposed public trail system. These instances would create an increased workload for the refuge law enforcement officer.

Finally, most of the proposed trail would lay off-refuge or traverse the border of the refuge. We are concerned with who would assume responsibility for trail maintenance and the enforcement against illegal or unauthorized uses. Most of the public would likely assume the trail is owned and maintained by the refuge and would, therefore, expect refuge staff, including the law enforcement officer, to address any trail issues.

Non-Priority Activities Allowed
In addition to the five priority recreational and educational uses we allow, we have determined that several other activities are appropriate and compatible on refuge lands under certain circumstances. They include: dog walking (leash only), research, and certain outdoor events. These activities are either discussed earlier in this section or described in detail under "Goals, Objectives, and Strategies," and included in appendix B.

Special Use Permits
A special use permit may be issued for specialized or unique activities allowed on the refuges. The refuge manager will evaluate each activity for their appropriateness and compatibility on a case-by-case basis as they are requested. These activities could include groups of 10 or more individuals or self-guided groups who wish to host their own wildlife-dependent activities, or research activities. Groups of 10 or more are required to have permission for wildlife observation and photography, environmental education, and interpretation. Each request must be presented in writing with details of who, what, where, when, why, and how the activity will be conducted. Each request has different logistics and, therefore, will be evaluated for impacts on the refuge mission. Using professional judgment, as long as there is no significant negative impact to natural resources or visitor services, or violation of refuge regulations, a special use permit will be issued outlining the framework in which this use can be conducted. Refuge staff will ensure compliance with the special use permit.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an EA or an environmental impact statement (EIS). Most of the major actions in this CCP were fully analyzed in the draft CCP/EA and

are described there in enough detail to comply with NEPA, and do not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category:

- Biological inventories and monitoring
- Modifications to our public use programs, including expanded deer hunting and a new youth turkey hunt
- Controlling invasive plants and animal pests
- New refuge housing
- An RV pad for trailer parking
- New trails on existing roadbeds

Although we analyzed the impacts of most management actions in the draft CCP/EA, additional or supplemental NEPA analysis will be necessary for certain types of actions. An example of this is our proposal to evaluate the need for, and feasibility of, shoreline protection projects on the refuge. Should we determine a proposed action that requires major construction to protect the refuge shoreline, we will conduct a detailed NEPA analysis, including public involvement, before a decision on a particular design is reached. Similarly, if we determine the need to conduct extensive forest management activities to address forest health or improve wildlife habitat, we will conduct a detailed NEPA analysis, including public involvement, before a decision is made. In either case, these are management actions whose precise details and therefore consequences cannot be known by the Service at this time.

Green heron

Eugene Hester/USFWS

Mason Neck Refuge Goals, Objectives, and Strategies

Detailed Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of mature hardwood-mixed forests to support native wildlife and plant communities, including species of conservation concern.**

Objective 1.1 Mature Hardwood-mixed Forest—Bald Eagles

Actively manage 1,883 acres of forest to provide bald eagle nest and roost sites (for a minimum of 3 pairs of eagles). Protect all known sites by preventing disturbance using VDGIF and Service recommendations. Provide for potential new nest trees which are typically taller than the surrounding canopy with a large, branching limb structure providing easy access and wide views near marshes and rivers.

Rationale

Bald eagles generally nest near coastlines, rivers, large lakes, or streams that support an adequate food supply. In forested areas, bald eagles often nest in mature or old-growth trees, selecting the tallest trees with limbs strong enough to support their nests, which can weigh up to 1,000 pounds. Nest sites typically include at least one perch with a clear view of the water where the eagles usually forage (USFWS, 2007b). For warmth during the winter, bald eagles sometimes use conifers and floodplains bounded by river bluffs at nighttime or when wind is severe (INHS, 2008).

The Potomac River and other major tidal rivers in Virginia also have areas where non-breeding eagles are known to concentrate for roosting and feeding. These areas may be used by non-breeding eagles in both summer and winter. These eagle concentration areas are extremely important because they are used by eagles from throughout the East Coast, as well as by resident eagles (USFWS/VDGIF, 2000).

A variety of food sources best satisfies the bald eagles' dietary needs (VAFWIS, 2010). The geographic area and season determines the diet. Bald eagles acquire the majority of their food in the shallow waters of low tide. Bald eagles use a variety of hunting techniques such as striking fish and scavenging carcasses. Infrequently, bald eagles pursue waterfowl in the air, particularly injured birds (INHS, 2008). Brown bullhead *(Ameiurus nebulosus),* chain pickerel (Esox niger), white sucker *(Catostomus commersoni),* white perch *(Morone americana),* and smallmouth bass *(Micropterus dolomieui)* are major food sources for inland nesting bald eagles. However, marine mainland bald eagles predominately eat alewife, blueback herring, and American eel. In the winter, food sources include common goldeneye, bufflehead *(Bucephala albeola),* and red-breasted merganser *(Mergus serrator)* (VAFWIS, 2010).

In this region, eagle pairs build their nests from October through January, lay eggs from January to April, rear their young from February through June, and fledge their young from May to August. During this entire period, eagle reproductive success may be adversely affected by human disturbance. If agitated by human activities, eagles may inadequately construct or repair their nest, may expend energy defending the nest rather than tending to their young, or may abandon the nest altogether. Activities that cause prolonged absences of adults from their nests can jeopardize eggs or young. Depending on weather conditions, eggs may overheat or cool too much and fail to hatch. Unattended

eggs and nestlings are subject to predation. Young nestlings are particularly vulnerable because they rely on their parents to provide warmth or shade, without which they may die as a result of hypothermia or heat stress. If food delivery schedules are interrupted, the young may not develop healthy plumage, which can affect their survival. In addition, adults startled while incubating or brooding young may damage eggs or injure their young as they abruptly leave the nest. Older nestlings no longer require constant attention from the adults, but they may be startled by loud or intrusive human activities and prematurely jump from the nest before they are able to fly or care for themselves. Once fledged, juveniles range up to ¼ mile from the nest site, often to a site with minimal human activity. During this period, until about 6 weeks after departure from the nest, the juveniles still depend on the adults to feed them (USFWS, 2007b).

This refuge was established in 1969 as the Nation's first refuge dedicated to protecting bald eagle, using funds provided under the Endangered Species Act. Eagles nested and wintered on the peninsula as far back as colonial times, but in the 1950s and 1960s they succumbed to habitat loss due to human development and contamination from pesticides. With greater awareness, an increase in their protection both nationally and regionally, and a reduction in pollution, the eagle population has made a remarkable recovery. The removal of the bald eagle from the Federal list of endangered and threatened species was predicated on the assumption that they would continue to thrive in areas they presently occupy. Mason Neck Refuge is one location where their protection will remain a priority, regardless of the bird's status, since it supports the principal purpose for which the refuge was established. We will continue to be concerned about their health, productivity, and any disturbance or threats during nesting season. As we noted in chapter 1, the bald eagle continues to be protected by the Eagle Act and the MBTA.

USFWS

Bald eagle

The Service developed the National Bald Eagle Management Guidelines (2007) to help minimize impacts to bald eagles. To avoid disturbing nesting bald eagles, the guidelines recommend (1) keeping a distance between the activity and the nest (distance buffers), (2) maintaining preferably forested (or natural) areas between the activity and around nest trees (landscape buffers), and (3) avoiding certain activities during the breeding season. The buffer areas serve to minimize visual and auditory impacts associated with human activities near nest sites. Ideally, buffers would be large enough to protect existing nest trees and provide for alternative or replacement nest trees. These measures are all in place on the refuge.

With enhanced local and regional support for the existing and proposed strategies identified below, we believe the refuge can make an important

contribution to sustaining bald eagle nesting and wintering in the Chesapeake Bay region. Hiring a wildlife biologist will be an important component to accomplishing this objective.

Strategies

Continue to

- Protect all known active nest sites from human disturbance by restricting public access during sensitive nesting periods. The size of closed area depends on topography, vegetation, and sight distance.
- Post trail closures and/or warning signs at appropriate, visible locations to explain to visitors the restriction.
- Cooperate with VDGIF and Mason Neck State Park staff in monitoring bald eagle nesting activity.
- Use refuge law enforcement officer to conduct outreach and enforce restrictions.

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities.
- Work with Service and VDGIF bald eagle experts to define potential nest and roost stands, in addition to those currently used by eagles. Identify possible stand treatments to enhance both potential and currently used areas; consider such actions as thinning, planting, tree release, and fuel reductions to protect areas from potential wildfires and provide optimum growth for potential nest trees.
- Ensure management actions meet or exceed the guidelines for protection and management of eagle sites as identified in the Service's National Bald Eagle Guidelines (2007).
- Develop nest and/or roost site management plans as warranted, prioritizing actions and developing an implementation schedule. Incorporate plans into HMP.
- Create and maintain a GIS database with locations of active and potential nest and roost sites, and any management activities. Annotate database with results of annual surveys.
- Work with VDGIF to conduct mid-summer and mid-winter surveys on the refuge. If funding allows, also conduct nest productivity surveys.

Monitoring Elements

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:
  - Monitor changing bald eagle roost and nest use and make modifications or restore sites as necessary to ensure favorable site conditions. Monitor and control invasive plants, erosion, human disturbance, and other sources of habitat degradation to protect the integrity of roost, nest, and concentration areas on refuge property.

- Continue to incorporate nest and roost stands into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts. Landbird point count habitat classifications in or near roosts will be updated to track changes in habitat relative to bird habitat use.

Objective 1.2 Mature Hardwood-mixed Forest—Migrating Forest-dependent Birds

Protect and manage a healthy, contiguous, mature hardwood-mixed forest on 1,883 acres benefiting migrating forest-dependent birds, as well as breeding forest-interior dwelling birds and other native wildlife. A healthy mature hardwood mixed forest is characterized by

- canopy dominant and co-dominant species consisting of oaks, hickory, poplar, maple, sweet gum, black gum, and beech with patches of coniferous trees such as Virginia and loblolly pine;
- low edge to interior ratio;
- basal area of less than 100 square feet per acre;
- advanced regeneration of canopy trees (1-4 inches diameter at breast height (DBH)) greater than 300 stems per acre; and
- a diverse, native shrub layer represented by low and highbush blueberry, mountain laurel, pawpaw, arrowwood, *Viburnum* spp., wintergreen, greenbriar, Virginia creeper, partridgeberry, Solomon's seal, and wild yam with stem densities of greater than 1,500 per acre.

Rationale

Consistent with managing for bald eagles (objective 1.1) and the heron rookery (objective 1.3), our mature mixed forest management will emphasize habitat for migrating forest-dependent birds. Coastal forests and woodlands within the ACJV's BCR 30 region are crucial stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (Steinkamp, 2008). Destruction and fragmentation of forests in both breeding and wintering areas are factors in forest bird species declining abundance (Roth et. al., 1996). Many of the declining forest birds are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and overbrowsing by white-tailed deer (Rich et al., 2004).

Of particular concern in forest habitats in the region is the decline of forest interior dwelling species or FIDS, which require large contiguous forested tracts to maintain viable populations. A minimum habitat patch size is considered to be at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). This minimum habitat patch size, in fact, would only be capable of supporting less area-sensitive FID species. The larger the contiguous forest patch, the higher the probability of supporting a diversity of productive breeding pairs.

Among a number of management recommendations for forest birds made in the BCR 30 Plan are the following:

- Increase and improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).
- Manage upland forest communities to provide post-fledging habitat (e.g., a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).

- Develop and implement programs to control invasive plant species.

In 2009, the VDF completed an assessment of forest health and condition on the refuge's 1,883 forested acres to inform decisionmaking in respect to managing bald eagles and neotropical migrants. One of the major threats to forest health and condition is deer overabundance. At Mason Neck Refuge, the lack of midstory woody species diversity is likely due to intense browse pressure of white-tailed deer leading to the widespread growth of holly and beech, and shrubs and forbs known to be unpalatable to deer (McGlone and Lasher, 2009). Ensuring deer browse pressure does not significantly impact regeneration of woody species regeneration is essential in the success of the development of the refuge's forest understory. Numerous studies have found when white-tailed deer browse pressure is high, it can alter the growth, reproduction (Knight, 2003), diversity (Latham et al., 2005), and, ultimately, survival of plants within a specific population (Alverson and Waller,1997, Cote et al., 2004). In areas where deer density exceeds 20 deer per square mile, deer herbivory is related to declines in mid-story bird species (deCalesta, 1994). Other threats include gypsy moth infestations and spread of invasive plant species.

We believe refuge lands make an important contribution to the regional bird populations of FIDs such as wood thrush, Acadian flycatcher, and prothonotary warbler. These species are known to breed on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds species of conservation concern that would benefit from a diverse, mature, mixed-deciduous forest include the eastern wood peewee, Kentucky warbler, cerulean warbler, Louisiana waterthrush, yellow-throated vireo, whip-poor-will *(Caprimulgus vociferus),* northern flicker *(Colaptes auratus),* scarlet tanager (Piranga olivacea), and raptors such as red-shouldered hawk, northern saw-whet *(Aegolius acadicus),* and barred owl (Rosenberg et al., 1999).

Hiring a refuge biologist and obtaining increased project funding will allow us to increase inventory, protection, and management of forest dependent species and the habitat features on which they depend.

Strategies
Continue to
- Support partner-led MAPS station bird survey work.
- Support volunteer-led bird survey work on an opportunistic basis.
- Work with VDGIF to assess deer populations and deer impacts on native vegetation.
- Conduct annual deer hunt as a means of keeping deer population in check and prevent deterioration to the forest understory and herbaceous layer.
- Work with USDA-FS to evaluate threat of gypsy moth outbreak.
- Be vigilant for unusual concentrations of pests, pathogens, and invasive plants and respond with respective treatments accordingly. These may include both chemical and mechanical controls (also see objective 1.5 below).
- Work with researchers, educators, conservation partners, and/or volunteers on an opportunistic basis to collect resource information on forest dependent wildlife and plants.
- Conduct outreach, education, and interpretation with visitors to explain the refuge's importance to the full complement of forest wildlife and plants.

- Minimize the potential for disturbance to unique habitat features by restricting public access to designated trails only.

- Interpret the importance of vernal pools and the other habitat features as important to a wide variety of wildlife in refuge literature and during refuge programs.

Over the 15 years of CCP implementation:

- Hire additional biological staff as identified in the staffing chart (appendix E) to plan, coordinate, and implement activities identified under this and all other objectives under goals 1 and 2. For example, these staff will develop HMP, IMP, and IPM plans, coordinate all field survey work, conduct GIS mapping, and coordinate forest management treatments. The senior biologist will also take a lead role in communicating with conservation partners.

- Enlist forest ecologists to conduct and evaluate results of forest health and condition inventory and assessment identifying the most significant threats to sustaining biodiversity, stand structure, function, and composition. If possible, work with State and Federal agencies, non-governmental conservation organizations, and/or universities with this expertise and that have worked in this region.

- Develop forest prescriptions with consideration of meeting migration requirements for neotropical landbirds and improving forest health; incorporate prescriptions, stand treatments, and implementation schedule in HMP. The range of possible treatments may include prescribed fire, thinnings, plantings, and patch cuts or regeneration cuts to restore, enhance, and maintain desired structural and species composition.

- Evaluate, with FMP update planned in 2011, needs to reduce fuel loading given the wildland-urban interface.

- Prioritize and implement those treatments that will protect forest health, reduce wildfire safety concerns, and complement bald eagle and migratory bird objectives.

- Maintain all data collected in GIS database.

- Consider other methods to reduce the deer herd in addition to the established public hunt, if further reductions are recommended to protect forest health and condition.

- Continue coordination with the USDA-FS for gypsy moth or other pest monitoring and control. Also coordinate with Mason Neck State Park and other adjacent landowners on Mason Neck Peninsula to make control measures more efficient.

- Evaluate all management actions to ensure they do not contribute to further forest fragmentation

- Develop a GIS based habitat map and maintain it to current Regional protocols

- Incorporate survey updates and map occurrences of vernal pools and other unique fine-scale habitat features; as sites are identified, determine if there are opportunities to further protect, restore, create, and/or enhance sites to benefit species of conservation concern. Include any plans for management and their priority and schedule in HMP. Incorporate detailed plans for a given year in an annual habitat work plan (AHWP).

- Establish priority needs to inventory and/or monitor for forest wildlife and plants of conservation concern. Incorporate planned activities, their priority, and schedule in the IMP. Given available funding and staffing, or under partnerships, implement priority activities.


Bill Wallen
Water pipit

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native forest species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Conduct spring and fall landbird surveys for measuring species composition and relative abundance within the refuge's mature hardwood-mixed forests.

  - Evaluate the effectiveness of white-tailed deer hunting program on regeneration of native trees, shrubs, and forbs by conducting vegetation surveys to gather information on species composition, abundance, and diversity.

  - Maintain desired quality and characteristics of forests for forest interior migratory birds by annually conducting scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge upland acreage, and fundamental objectives are not compromised.

  - Monitor presence of coyotes *(Canis latrans)* and beaver and work with USDA–Animal and Plant Health Inspection Service (APHIS) or other licensed agent to control these species, as necessary to protect public safety and refuge resources.

  - Conduct surveys of anurans (frogs and toads), to monitor overall diversity and indications of habitat changes that affect local populations or to evaluate for further vernal pool protection or management.

Objective 1.3 Heron Rookery

Actively protect 61 acres of mature hardwood-mixed forests that support one of the largest great blue heron breeding colonies in the Mid-Atlantic region by maintaining a vegetative buffer zone of at least 1,000 feet surrounding the rookery and managing public access to prevent disturbance to roosting and nesting birds.

Rationale

Great blue heron breed across the U.S. and southern Canada, and more than half of the Atlantic coast's breeding population nest in Chesapeake Bay—predominantly in wetlands. The Chesapeake Bay, coupled with surrounding wetland and forested areas in its river tributaries, provides both the ideal food and habitat necessary for great blue heron survival. Optimal habitat conditions for nesting great blue herons include: 1) close proximity (approximately 1.4 miles) to quality foraging habitat and 2) protection from disturbance and predators (typically islands, trees in swamps, or high branches). Great blue herons nest mostly in trees, but the selection of tree species is highly variable. Herons are present year round in the refuge area; however, the refuge is best known for its large rookery. The Mason Neck Refuge colony supported an estimated 1,400 nests as recently as 2003, although our monitoring has indicated numbers have declined to approximately 800 nests in recent years. We are not sure of the

reasons for their decline and, unfortunately, have not had the opportunity to study it further.

In other areas of the Chesapeake Bay watershed, loss of nesting sites and deterioration of water quality and wetland habitat are issues of concern for their survival. Natural generation of new nesting islands, created when old islands and headlands erode, has decreased due to artificial hardening of shorelines with bulkheads. Poor water quality reduces the amount of large fish and invertebrate species available in wetland areas. If suitable feeding and nesting areas are not maintained, populations of great blue heron will eventually decline. Toxic chemicals that enter the bay from runoff and industrial discharges pose yet another threat. Although great blue heron currently appear to tolerate low levels of pollutants, these chemicals can move through the food chain, accumulate in the tissues of prey, and may eventually cause reproductive failure in heron.

Care must be taken to preserve nesting sites, as well as feeding areas. Erosion of island nesting areas due to artificial structural development, as well as sea level rise, needs to be carefully monitored. Human disturbance at nesting sites can be a problem and studies recommend that people maintain a distance of at least 660 feet to minimize disruption of the heron colony. If heron are disturbed frequently, they may abandon their nests or neglect their young. To avoid this concern, the refuge does not allow public access during the nesting season. Deterioration of SAV limits foraging area potential. Wetland foraging sites within 9 to 12 miles of heron colonies need special protection to ensure prey availability.

Recently, the MDNR and the VDGIF sponsored surveys to monitor populations and annual nesting success of great blue heron. They also monitor colonies of other species of heron and egrets. In early spring before the trees have leaves, aerial surveys are conducted to locate colony sites and count nests. At larger colonies, ground counts are made of active nests.

In order to maintain a relatively stable, substantial population of great blue heron in the watershed, protection of shallow water habitat, feeding areas, and rookeries must remain a priority (USFWS–CBFO, 2009). On Mason Neck Refuge, we will continue to protect the rookery from human disturbance while also monitoring its population and evaluating the habitat condition to determine whether any habitat enhancements are needed.

Strategies

Continue to

- Prohibit public access to Little Marsh and surrounding bluffs and adjacent forest. Both foot and boat access is prohibited.
- Communicate the unique and regional significance of the heron rookery at outreach opportunities such as refuge programs, events, on the Web site, and in other refuge printed information.
- Allow volunteer-led efforts to count nest sites.
- Use law enforcement officer to conduct outreach and enforce closure area.

Over the 15 years of CCP implementation:

- Work with experts to assess and implement measures to increase shoreline and bluff protection to reduce potential loss of nesting trees (also see objective 2.4).
- Using Sea Level Affecting Marshes Model (SLAMM) analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives where possible and applicable.

- Increase Service visibility and law enforcement presence, increase signage, and other measures, as warranted, to keep unauthorized persons away from the rookery during breeding season.

- Establish a rookery monitoring program with partners and volunteers, and incorporate data in GIS. Monitor such things as nest numbers, locations, and shifts in their use between years, impacts to vegetation, and impacts from predators (e.g. raccoons) on the population.

- Consult with waterbird experts to determine whether any vegetation management actions could enhance rookery conditions. Incorporate any plans into HMP.

Monitoring Elements

- Conduct appropriate monitoring and survey programs as funding and staffing permits to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, or trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor changing heron roost and nest use and make modifications or restore sites, as necessary, to ensure the favorable roosting conditions of the site.

  - Monitor and control invasive plants, erosion, human disturbance, predators, and other sources of habitat degradation to protect the integrity of roost, nest, and concentration areas on refuge property.

- Continue to incorporate these stands into ongoing biological surveys, such as habitat-based landbird count surveys, winter and summer bald eagle surveys, migration and winter bird counts, and anuran call counts. Landbird point count habitat classifications in or near roosts will be updated to track changes in habitat relative to bird habitat use.

GOAL 2: **Protect, enhance, and restore the biological integrity, diversity, and environmental health of wetland habitats and shorelines to support native wildlife and plant communities, including species of conservation concern.**

Objective 2.1 Great Marsh Management

Develop an index of ecological integrity for the Great Marsh wetland complex and a baseline for future monitoring of the biological integrity, diversity, and environmental health of this 207-acre tidal freshwater marsh. Implement strategies, as warranted by monitoring results, to insure that no degradation of integrity occurs, including protection against increases in the extent or abundance of invasive plants. Management will emphasize and reflect the composition, function, and diversity of this habitat type, benefiting migrating and wintering waterfowl (e.g., American black ducks, blue and green-winged teal, northern shoveler) and wading birds (e.g., great egrets, great blue herons, and green herons).

Rationale

Freshwater tidal marshes were once extensive along the Coastal Plain rivers of the Mid-Atlantic region of the United States. After thousands of years of relatively low-impact use by Native Americans and several centuries of intense development by European Americans, freshwater tidal marshes have been reduced to scattered remnants that are now incapable of providing the extent of ecosystem services characteristic of widespread, healthy marsh ecosystems (Odum et al., 1984). Nonetheless, even remnant marshes provide numerous goods and services that benefit human society, including resident and migratory wildlife

habitat, refuge for endangered and other rare species, spawning and nursery grounds for anadromous fish, attenuation of tidal energy, shoreline stabilization, flood control, water quality enhancement, carbon storage, aesthetic enjoyment, and recreational activities (Odum et al., 1984). Consequently, maintenance and enhancement of remaining tidal marsh is imperative both socially and ecologically.

Chronic sea level rise is advancing the salinity gradient upstream in rivers on the Atlantic Coast, leading to shifts in vegetation composition and the conversion of some tidal freshwater marshes into oligohaline marshes.

The 207-acre Great Marsh represents the largest tidal marsh on the refuge and is considered regionally significant due to its size and undisturbed setting. The marsh hosts a large concentration of wintering waterfowl. Species commonly seen include Canada geese, American black ducks, mallards, wood ducks, blue- and green-winged teal, northern shovelers *(Anas clypeata),* tundra swans, and northern pintails. Marsh birds commonly seen include great blue herons, great egrets, green herons, and pied-billed grebes *(Podilymbus podiceps).* Bald eagles have nested on an island in the marsh for over a decade and portions of the Woodmarsh Trail are closed during nesting to prevent nest disturbance. VDGIF annually conducts banding operations in the marsh, primarily for black and wood ducks. They also sample for avian influenza.

Strategies

Continue to

- Prohibit public access to Great Marsh; both foot and boat access is prohibited.
- Communicate the unique and regional significance of the Great Marsh at outreach opportunities such as refuge programs, events, on the Web site, and in other refuge printed information.
- Work with VDGIF to conduct winter waterfowl banding and avian influenza monitoring in this area.
- Use law enforcement officer in the field to conduct outreach and enforce closure area.

Over the 15 years of CCP implementation:

- Develop an index of ecological integrity to
- determine the current integrity ranking;
- determine what areas of integrity are low and need attention;
- prioritize management actions to ensure that the index does not decrease; and
- establish a baseline from which to measure against the targeted 5 to 10 percent improvement.
- Inventory the flora and fauna of Great Marsh to establish a baseline of natural features and water quality to monitor in the future. In particular, determine presence and extent of native marsh and aquatic vegetation, such as spatterdock and wild rice, which are important waterfowl foods.
- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

- Using SLAMM analysis results, monitor and evaluate conditions in the marshes over the next 15 years with respect to climate change and sea level rise. Coordinate with regional efforts and initiatives, where possible and applicable.

- Work with State and Federal agency partners to address any significant water quality issues as they arise in the Potomac River.

- Work with volunteers, the Friends Group, and/or other partners to establish a clean-up program in the marsh.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native tidal freshwater marsh species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Develop the integrity index and use to determine what areas of integrity are low and need attention.

  - Conduct vegetation surveys within the marsh to determine species composition and diversity.

  - Conduct inventories and monitoring of waterfowl and wading birds. Use data to document the effectiveness of management activities and adjust management, as necessary.

  - Conduct fish surveys to document species abundance, composition, and diversity.

Beaver are common on the refuge.

- To maintain desired quality and characteristics of the tidal freshwater marsh, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand-replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge wetland acreage, and fundamental objectives are not compromised.

- Monitor presence of beaver and work with the USDA-APHIS or other licensed agent to control these species, as necessary to protect public safety and refuge resources.

Objective 2.2 Little Marsh Management

Manage the existing 50-acre Little Marsh impoundment and 1.5-acre Little Marsh Road impoundment to enhance quality habitat for wading birds (e.g., least bitterns, great blue herons, and black-crowned night-herons *[Nycticorax nycticorax]*) and waterfowl (e.g., wood ducks and hooded mergansers) during the breeding season and during peak spring and fall migration periods, while also providing habitat for other priority species of concern identified in the BCR 30 plan (e.g., bald eagles, Louisiana waterthrush, and prothonotary warblers) and other native wildlife identified as species of greatest conservation concern in the Virginia WAP (e.g. American bittern, king rail, little blue heron *(Egretta caerulea),* and yellow-crowned night-heron *[Nyctanassa violacea}*). Actively manage through a combination of water level management, wetland restoration, and invasive species control. These measures will include the following:

1) Annually provide high quality foraging habitat for wading and marsh birds, specifically great blue herons (summer: July-late August). This habitat will consist of open, shallow water (2-10 inches water depth) with patches of emergent wetland plants that support fish, invertebrates, and amphibians.

2) Annually support migratory waterfowl through a mix of shallow (6-24 inches water depth) flooded vegetation (*Carex* spp., *Polygonum* spp., *Peltandra* spp.) at times of peak migration (spring: late March, and fall: late October).

3) Annually support migratory wading birds through a mix of shallow remnant pools (6-12 inches water depth) at times of peak migration (spring: late March, and fall: late August).

Rationale

The Little Marsh impoundment provides bald eagles and great blue heron a relatively secluded wetland with surrounding mature hardwoods and conifers and an abundance of food in close proximity. This juxtaposition of habitat features is critical to supporting nestlings and fledglings for all the species noted in the objective, particularly bald eagles and great blue herons.

The 50-acre Little Marsh contributes significantly to biological diversity on the refuge. It hosts a variety of wintering and migrating waterfowl, similar to Great Marsh. Water levels in the marsh can be regulated with a water control structure. Throughout most of the year, the water level is kept high to control growth of undesirable woody vegetation and to provide winter habitat for waterfowl. In July, the marsh is drawn down to promote the growth of preferred waterfowl foods around the perimeter while concentrating fish in the deeper channels which increases the availability of prey for fledgling eagles and herons.

The 1.5-acre Little Marsh Road impoundment is an upgradient impoundment that provides opportunities for effectively managing a small freshwater wetland for a diversity of species of conservation concern. The following birds of conservation concern are known to breed on Mason Neck Refuge and could benefit from enhanced management of the Little Marsh Road impoundment:

prothonotary warbler, Louisiana waterthrush, bald eagle, wood duck, hooded merganser, least bittern, black-crowned night-heron, great blue heron, and green heron. Their conservation status in various ecoregional plans is presented in appendix A.

Hiring a biologist and obtaining increased project funding will allow us to upgrade our management and protection of the Little Marsh Road impoundment.

Strategies
Continue to

- Prohibit public access to Little Marsh; both foot and boat access is prohibited.
- Maintain signs alerting boaters it is prohibited to land on the dike.
- Use law enforcement officer to conduct outreach and enforce restrictions.
- Maintain water control structures and road culverts.
- Conduct a slow drawdown, lasting about 4 weeks in summer, to improve foraging habitat for wading birds, specifically great blue herons.
- Exclude public from Little Marsh Road to protect sensitive wildlife and habitats.

Over the 15 years of CCP implementation:

- Determine the water level regime by season that will best promote quality marsh habitat favored by bald eagles, wading- and waterbirds, and waterfowl. Implement plans to manipulate water levels and vegetation at draw down times throughout the year, and incorporate actions in HMP. In developing water level management, consider:
  - Lowering water level to allow bottom to dry out and oxygenate to allow better emergent plant growth, and/or reflooding to a lower level to provide better access to feeding areas by wading birds.
  - Timing drawdown initiation when great blue heron young are observed in the nests. This will allow for sufficient time to conduct the drawdown and concentrate food resources.
  - In the summer, consider only drawing down water levels to the point where water primarily remains only within the channels and various coves of the impoundment. Thus, concentrating prey resources into the smallest volume of water accessible to great blue herons.
  - Maintain high water levels throughout a growing season and/or use prescribed fire to eliminate perennial woody vegetation that is encroaching upon the impoundment. Frequency of woody vegetation management may be dictated by heron use.
  - Reflood the impoundment prior to fall frost and freezing weather to allow amphibians and reptiles sufficient time to locate underwater overwintering habitat. Maintain water depths throughout the winter that are sufficient for fish populations.
- Control beaver, if needed, to meet water regime objectives. Both non-lethal and lethal measures will be employed, as warranted.
- Inventory the flora and fauna of the marsh to establish a baseline of priority natural resources to monitor in the future. In particular, determine presence and extent of native marsh vegetation.

- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species in Great Marsh. Potential species occurring in the marsh include sensitive joint-vetch, Parker's pipewort, and river bulrush.

- Determine fish species that currently and/or historically use the impoundment for spawning and rearing.

- Upgrade the water control structure, as needed, to improve management capability and consider placing a "windowed" stop-log water control structure to allow fish passage into the impoundment.

- Hire additional maintenance staff, as indicated on the staffing chart (appendix E), to help manage and maintain water control structures.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal to achieve structural and species diversity of native wetland species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:

  - Monitor bird response to drawdown rates and water depths to determine optimal water depths for target species groups.

  - Conduct vegetation surveys within the marsh to determine species composition and diversity.

  - Conduct fish surveys to document species abundance, composition, and diversity.

  - To maintain desired quality and characteristics of the refuge's impoundments, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge wetland acreage, and fundamental objectives are not compromised.

  - Monitor presence of beaver and work with USDA-APHIS or other licensed agent to control these species as necessary to protect public safety and refuge resources.

Objective 2.3 Shoreline Protection

Increase efforts to maintain the integrity of the 4.4. miles of refuge shoreline and minimize bluff erosion on the Potomac River by working with partners to monitor and maintain the existing 200 feet of breakwater structures and conduct a risk assessment to prioritize additional restoration areas and protection methods.

Rationale

Refuge lands currently include approximately 4.4 miles of shoreline at the base of high bluffs along the Potomac River and Occoquan Bay. Erosion of the shoreline by tidal and storm flows, undermining of the bluffs by beach loss, and erosion by wind and rain have been incrementally removing the substrate, and the resulting tree loss shrinks important upland habitats. This is especially problematic along the refuge southwestern corner, where tree loss threatens the heron rookery. We will continue to explore and evaluate stabilization techniques to determine which is most effective and practical for refuge lands.

Obtaining increased funding and staffing will allow us to enhance our efforts to address this continuing threat to refuge habitat integrity as well as better protect archaeological resources along the shoreline.

Strategies
Continue to
- Minimize public access to shoreline.
- Seek partnerships to fund and install breakwaters and/or other measures to protect the shoreline.
- Work with partners to maintain the refuge shoreline and monitor the 200 feet of breakwater structures.

Over the 15 years of CCP implementation:
- Engage in public outreach and education to explain the sensitive nature of shoreline habitats and the importance of reducing human disturbance, particularly along the proposed Captain John Smith Chesapeake National Historic Trail.
- Manage public use in these areas to ensure compatibility of visitor's activities, especially during sensitive times of the year for wildlife.
- Monitor areas of substantive loss and work with experts to determine the feasibility of projects to mitigate shoreline erosion and wetlands impacts, especially in the context of predicted sea level rise.
- Seek partners and funding to implement priority projects assuming they are practical and feasible, cost effective, and commensurate with resource values.

Monitoring Elements
- Conduct appropriate monitoring and survey programs, as funding and staffing permits. The following are all components of how we will measure our success with respect to our objectives, and the results may trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives. Examples of monitoring or surveys that we may implement include:
  - Work with partners to monitor the effectiveness of existing refuge shoreline breakwater structures in reducing erosion along the protected area of the shoreline.
  - Partner to monitor the erosion rates along unprotected areas of the shoreline and determine the areas in greatest need of protection.

Objective 2.4 Aquatic Habitat and Water Quality

Improve the water quality and aquatic habitat of Great Marsh and other tidally influenced marshes and inlets through an active role in local, State, and Federal partnerships to reduce contaminants and enhance spawning, nursery, foraging, and cover habitat for Federal trust fish populations, including American eel, alewife, blueback herring, hickory shad *(Alosa mediocris),* American shad, menhaden, striped bass, Atlantic and shortnose sturgeon, and other native aquatic species. Partnerships may involve facilitation, research, monitoring, and management.

Kraft, C.E., D.M. Carlson, and M. Carlson. 2006. *Inland Fishes of New York (Online),* Version 4.0. Department of Natural Resources, Cornell University, and the New York State Department of Environmental Conservation.

Alewife

Rationale
The tidal Potomac River and associated marshes and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek),

the smaller streams that include Great Marsh creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish that are listed as species of concern by VDGIF (2005) and are Service Regional high priorities include the shortnose sturgeon (Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV). Other species of management concern listed in the Service's Region 5 Strategic Fisheries plan include: blueback herring, hickory shad, menhaden, and striped bass (USFWS, 2009b). All of the species listed above occur from the fall line to the mouth of the river at some time during their life cycle.

Due to lack of available staff, the refuge is reliant upon partnerships to improve aquatic habitat and operates in the capacity of allowing others access to the Potomac River and its tributaries in order to support the needs of Federal trust fish species. We respond to requests for assistance related to fisheries issues from our Virginia Fisheries Program Office, as well as from VDGIF and the Potomac River Fisheries Commission (PRFC). The VDGIF and PRFC regulate the fisheries of the main stem of the tidal Potomac River from the Maryland/ District of Columbia boundary line (near the Woodrow Wilson Bridge), to the mouth of the river at Point Lookout, Maryland and Smith Point, Virginia. The PRFC regulates and issues licenses for all recreational and commercial fishing, crabbing, oystering, and clamming in the main stem tidal Potomac River. The PRFC coordinates regulations with the Maryland DNR, the Virginia Marine Resources Commission (VMRC) and VDGIF, and with the other Atlantic Coastal States through the Atlantic States Marine Fisheries Commission (ASMFC). Obtaining increased funding and staffing will allow us to upgrade our efforts to better facilitate this much needed monitoring, management, and research.

Strategies

Continue to

- Provide assistance to researchers upon request, typically as logistical support, to facilitate their research on fish and other aquatic species on the refuge and in the tidal Potomac River.

- Monitor invasive aquatic species and distribution, and treat when funding and staffing allows.

Over the 15 years of CCP implementation:

- Coordinate with the Service's Virginia Fisheries Program Coordinator's Office to assess fisheries resources on the refuge and determine enhancement opportunities.

- Participate in partnerships with other State and Federal agencies to address interjurisdictional fish issues related to the refuge and nearby Potomac River waters.

- Work with the Virginia Ecological Services Office to provide information and input to the contaminant and TMDL regulation process at the Federal and State level.

- Participate in spill prevention, control, and countermeasure plans or other environmental emergency action plans related to protection of Great Marsh and the Potomac River.

- Work with Virginia Ecological Services and the Virginia Fisheries Coordinators Office in coordinating and providing technical assistance to fish passage, stream, and riparian restoration projects within the Potomac River watershed that have potential to increase available habitat for species utilizing the refuge or improvements to water quality.

Monitoring Elements

- Establish and coordinate development of a water quality monitoring station at the refuge with interested parties such as George Mason University.
- Work in partnership with local universities, as well as State and Federal agencies, to complete a series of fish inventories to obtain baseline information of fish species diversity and species health in order to evaluate impacts of tidal marsh water quality changes.
- Conduct inventory surveys of bird, mammal, amphibian, and turtle populations within and around the freshwater tidal marsh in partnership with local universities. Utilize data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

GOAL 3: Provide quality, compatible wildlife-dependent recreational opportunities with particular emphasis on interpretation, wildlife observation, and photography.

Objective 3.1 Deer Hunting

Continue to improve the annual, public, high-quality white-tailed deer hunt program to support deer population and forest health and condition objectives.

Rationale

Deer hunting accomplishes a very significant function on the refuge by keeping the deer population within the carrying capacity of the habitat. Our hunt program is primarily designed to manage the herd size on the refuge to benefit forest integrity, diversity, and health, as well as the health of the deer herd. The recreational opportunity it affords is a secondary benefit. We, however, recognize hunting as a healthy, traditional outdoor pastime, deeply rooted in our American heritage and are pleased to be able to provide the opportunity. Public hunting opportunities have been on the decline as development pressures increase in the region. Hunting is one of the six priority wildlife-dependent public uses of the Refuge System as established in the 1997 Refuge Improvement Act. In addition, Presidential Executive Order #113443- Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat."

Deer management must occur across the entire Mason Neck Peninsula in order to be effective in balancing population with quality habitat conditions throughout the area. We will continue to cooperate with the Mason Neck Management Area to ensure that broader population goals are met. Our hunt is a joint effort with Mason Neck State Park, combining both land ownerships in the hunt area, in a permit-only and closely monitored hunt. Elsewhere on the peninsula, Gunston Hall has a limited hunt but is exploring ways to expand it, and the BLM is working with VDGIF, Fairfax County, and the refuge to continue hunting opportunities initiated in 2009. Using data collected by the VDGIF from harvested animals, we estimate population condition, age, and sex structure to help adjust the hunt program annually, as needed.

Since the refuge establishment in 1969, the deer population increased until 1990 when the refuge was opened to firearm and archery hunting. The refuge hunt program conforms to State regulations and additional refuge regulations stipulated in Title 50 of the Code of Federal Regulations. As the objectives in the 1990 hunt plan state, we intend to maintain the deer population at a level compatible with available refuge habitat (between 90 and 120 deer), to limit the amount of damage to public and private property in the vicinity of the refuge, and to provide a wildlife-oriented recreational opportunity for the public. As in all refuge programs, we make special accommodations upon request, whenever possible, to further facilitate accessibility.

The following are the guiding principles of our hunting program, according to Service policy (605 FW 2):

1) Manage wildlife populations consistent with Refuge System-specific management plans approved after 1997 and, to the extent practicable, State fish and wildlife conservation plans.

2) Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.

3) Provide opportunities for quality recreational and educational experiences.

4) Encourage participation in this tradition.

5) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Strategies

Continue to

- Cooperate with VDGIF in assessing deer population and condition estimates
- Provide technical support for deer hunt programs on other public lands on Mason Neck Peninsula
- Maintain current shotgun deer hunt program which includes
  - State and local partners involvement in hunt administration;
  - Mason Neck State Park as part of hunt area; and
  - an average target of 90 to 100 deer harvested per year; or otherwise a target number recommended by VDGIF biologists.

Over the 15 years of CCP implementation:

- Increase Service support for deer hunt programs on all public lands on Mason Neck Peninsula, encouraging each agency to implement a program; work collaboratively within the existing Mason Neck Manager's Working Group to design hunts.
- Consider increasing length of shotgun season, number of hunters, and their distribution when declining forest health and conditions warrant an increased harvest. Indicate changes each year in annual hunt plan.
- Annually review the amount of staff time involved with the hunt, and consider ways to be more efficient with its administration, such as seeking new partners, staying informed of new technology, and use of Web-based programs.
- Provide an archery deer hunt for qualified archers during the regular State archery season as soon as determined practicable and resources are available (similar to the program that was implemented in past years). Prior to implementation, ensure all administrative requirements are completed. Also, ensure adequate funding and enough refuge staff, VDGIF, and other partners are in place to help coordinate, administer, and support hunt. Implement hunt under the following guidelines:
  - Archery hunt area will be in refuge areas otherwise closed to visitors (so other refuge visitors are not affected) and will be a safe distance away from all trails open to non-hunting refuge visitors.

- Archery hunters will park in designated hunter parking areas away from the trailhead parking areas.

Objective 3.2 Youth Turkey Hunting

Work with VDGIF and other conservation partners to develop and implement a youth wild turkey hunt.

Jonathan Priday/USFWS

A new youth turkey hunt is planned for the refuge.

Rationale

As we mentioned in our discussion under objective 3.1, hunting is identified in the Refuge Improvement Act as a priority wildlife-dependent public use on refuges. In addition, Presidential Executive Order #113443- Hunting Heritage, "…directs Federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat." We also presented our guidelines for a quality hunt program under objective 3.1.

We recognize wild turkey hunting as a traditional outdoor pastime. When managed responsibly, it can instill a unique appreciation of wildlife, their behavior, and their habitat needs.

We also recognize that we must be proactive in engaging young people in wildlife conservation stewardship of the environment if we are to maintain a legacy of abundant wildlife and healthy habitats for future generations. One way to do that is to offer quality opportunities for youth participation in hunting on our refuges.

Strategies

Within 15 years of CCP implementation:

- Provide an annual youth turkey hunt under the following guidelines:

- Complete all administrative requirements for a new hunt as soon as determined practicable and when resources are available. Resources include adequate funding and enough refuge staff and partners to help coordinate, administer, and support hunt. Potential partners include VDGIF and National Wild Turkey Federation.

- Implement the hunt during the State's spring turkey hunting season. Only gobblers would be harvested and only by shotgun.

- Allow up to a maximum of five youth per day, over a three-day period. The three hunt days might not be consecutive. Each hunt day would be from sunrise to noontime.

- Locate youth hunt areas in pre-designated, well-distributed areas, which are otherwise closed to the public, to minimize user conflicts (so other refuge visitors are not affected). The pre-designated areas will be a safe distance away from all trails open to other refuge visitors.

- Require hunters to complete data forms to document their observations and hunt success.

Objective 3.3 Waterfowl Hunting

Enhance opportunities for more people to engage in waterfowl hunting in State waters near the refuge by actively supporting VDGIF's program.

Rationale

Since Mason Neck Refuge was established in 1969, the Service has not allowed waterfowl hunting on the refuge because it conflicts with the original refuge

establishment purpose of protecting bald eagles. Further, areas in Great Marsh are specifically closed to waterfowl hunting by Director's order (34 FR 34 194; October 9, 1969).

In less sensitive areas on the Potomac River and Occoquan Bay, we fully support waterfowl hunting as a legitimate wildlife-based recreational pursuit. We plan to support VDGIF in ensuring the public has opportunities for waterfowl hunting in those State waters near the refuge where it is currently allowed.

Strategies
Continue to
- Coordinate with VDGIF conservation officer in addressing any waterfowl hunting issues

- Prohibit waterfowl hunting on refuge lands

Over the 15 years of CCP implementation:
- Work with VDGIF to evaluate the use of temporary floating blinds to replace fixed blinds in State waters near the refuge shoreline to provide waterfowl hunting opportunities to more people.

Objective 3.4 Wildlife Observation and Photography

Enhance opportunities for wildlife observation and photography by upgrading trail and parking facilities, and constructing new trails, observation platforms, and photography blinds.

Rationale
The Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreation. Wildlife observation has also been identified by our Regional Visitor Services Review Team as an area of emphasis for this refuge. Both wildlife observation and photography promote the understanding and appreciation of natural resources and their management on all lands and waters in the Refuge System. Since 1971, the refuge has provided daily opportunities for wildlife observation and photography on refuge trails.

Pursuant to Service policy (605 FW 4 and 5), we follow these guiding principles for wildlife observation and photography opportunities at the refuge.

1) Provide safe, enjoyable, and accessible wildlife viewing and photography opportunities and facilities.

2) Promote visitor understanding of, and increase visitor appreciation for, America's natural resources.

3) Focus on providing quality recreational and educational opportunities, rather than quantity, consistent with Service criteria defining quality (605 FW 1 Part 1.10).

4) Minimize conflicts with visitors participating in other compatible, wildlife-dependent recreation.

Existing opportunities are available on the Great Marsh and the Woodmarsh Trails. These trails include parking areas, interpretative panels, and overlooks and observation platforms. These trails are promoted and described on informational signs, in refuge brochures, and on the refuge Web site. We will enhance existing infrastructure and site accessibility to increase the safety, quality, and diversity of these opportunities. We also plan to create additional trails, assuming archaeological field surveys verify that acceptable, or no, impacts to archaeological resources occur, on Sycamore Road and Treestand Road (map 4.1). These new and existing trails will be supplemented with new viewing platforms and photography blinds. The location of the new trails,

platforms, and blinds will provide visitors with quality viewing opportunities, while also minimizing disturbance to wildlife or sensitive plant communities. Not all of the platform locations have been finalized yet, as additional archaeological site evaluations need to occur.

Refuge trails will remain open during refuge hours of operation (typically April through September from 7:00 am to 7:00 pm and during October through March from 7:00 am to 5:00 pm, except as otherwise permitted under a special use or hunt permit). Only foot travel will be allowed on these existing and planned refuge trails.

One additional trail, the High Point Trail, begins outside the refuge boundary, but runs through the refuge and terminates at Mason Neck State Park (3.0 miles total; 0.5 miles on refuge). This is an asphalt multi-use trail, where bicycles and other non-motorized pedestrian uses are allowed. This trail is cooperatively administered and managed with Mason Neck State Park.

Strategies

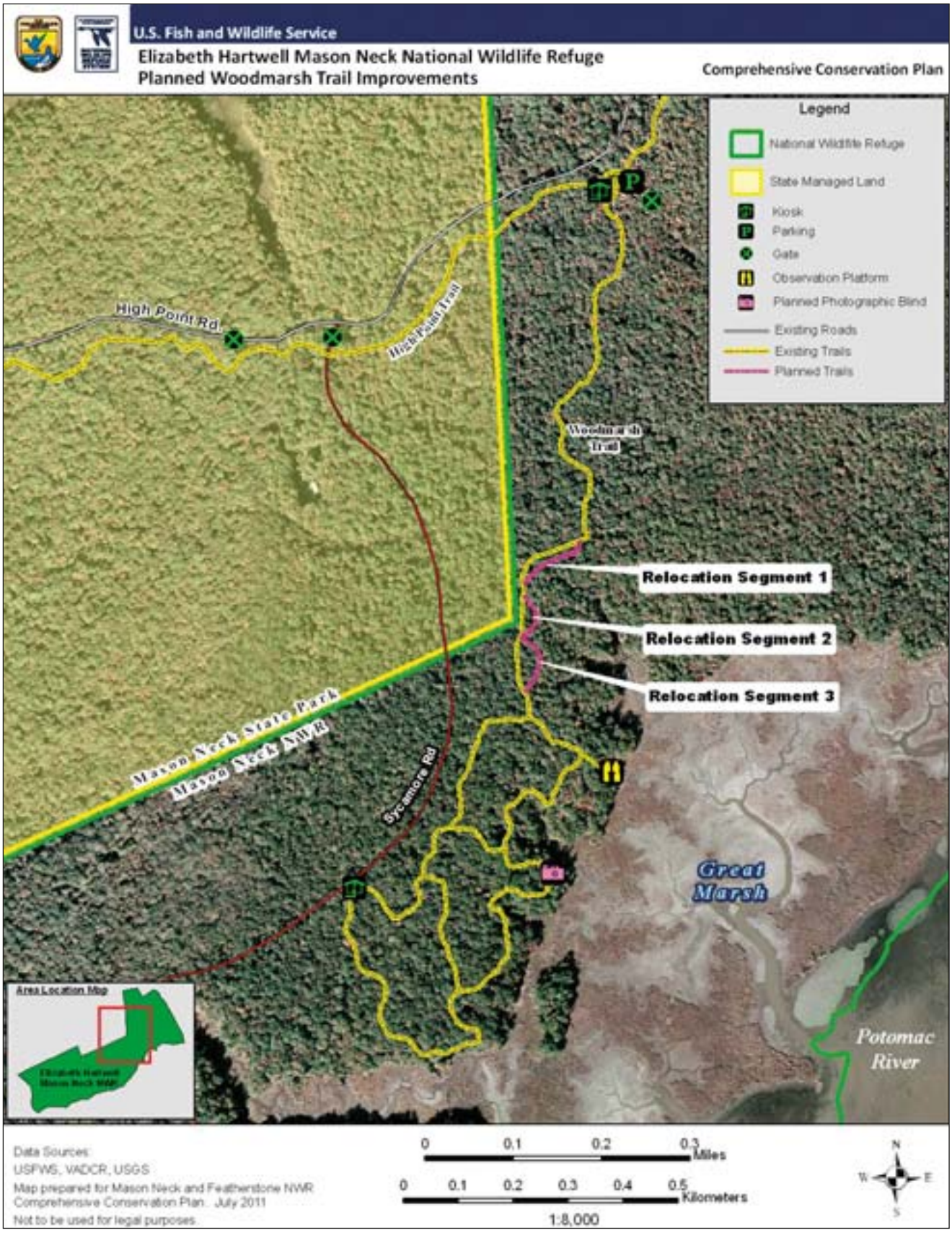
Continue to

- Maintain the current refuge trails:
- Woodmarsh Trail (2.5 miles)
- Great Marsh Trail (0.75 miles)
- Close portions of the Woodmarsh Trail from December to June to protect nesting bald eagles.
- Allow foot travel as the only mode of transportation on Woodmarsh and Great Marsh Trails.
- Cooperate in managing and maintaining the multi-use High Point Trail (3.0 miles total; 0.5 miles on refuge) with Mason Neck State Park; allowing all forms of non-motorized pedestrian access and travel.
- Prohibit motorized use and horseback riding on all trails.
- Prohibit geo-caching, letterboxing, and other forms of "treasure hunting" on the refuge.
- Continue to collect monthly visitor use data for the High Point, Great Marsh, and Woodmarsh Trails.

Over the 15 years of CCP implementation:

- Hire visitor services and maintenance staff as indicated in staffing chart (appendix E) to support new and/or improved refuge facilities, increased and enhanced visitor and outreach programs, and other expanded public uses and outreach identified under goals 3 and 4.
- Prioritize list of improvements and new construction noted below and implement projects as funding allows.
- Improve Woodmarsh Trail (see map 4.2) including:
  - Trail realignment to higher ground along approximately 1,000 feet by rerouting trail through aesthetically pleasing terrain to afford sustainable upkeep.
  - Improving trail surface to all-weather.

Map 4.2. Planned Woodmarsh Trail Improvements at Mason Neck Refuge



- Considering making part or all of the trail accessible.
- Improving boardwalks over wet areas.

- Improve Woodmarsh trailhead, including drainage, paving, lighting, gates, kiosk, and welcome and directional signs.
- Reconfigure Woodmarsh Trail within existing loops to bypass sensitive eagle area, but allow for additional access.
- Develop a trail leading from the Woodmarsh Trail-Sycamore Road kiosk to the end of Sycamore Road and the Potomac River overlook. This segment will be known as Sycamore Trail. Consider building a viewing platform overlooking Potomac River, if feasible. Ensure trail and platform construction do not adversely affect archaeological resources likely to be in the vicinity or sensitive nesting or roosting sites. Allow foot travel as the only mode of transportation on Sycamore Trail.

USFWS

Habitat diversity on Mason Neck Refuge

- Develop Treestand Road as a trail connecting Woodmarsh and Great Marsh Trails. This segment will be known as Treestand Trail. Create marsh viewing area if minimal vegetation would be impacted. Allow foot travel as the only mode of transportation on Treestand Trail. Seasonal closures may be warranted if disturbance to wildlife might occur.
- Collect visitor use data, according to Service guidance, to determine the number of visitors and what activities they are engaged in.Enhance the refuge's interpretive program to more effectively communicate to the public the values and regional significance of refuge habitats, wildlife, and cultural resources.

Objective 3.5 Interpretation Program

Enhance the refuge's interpretive program to more effectively communicate to the public the values and regional significance of refuge habitats, wildlife, and cultural resources.

Rationale

The Refuge Improvement Act identifies interpretation as a priority wildlife-dependent recreational activity. Interpretation has also been identified by our

Regional Visitor Services Review Team as an area of emphasis for this refuge. Interpretation includes, but is not limited to, activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

The refuge interpretive program includes a variety of experiences that appeal to varying audiences, visitor interests, and learning styles. By having quality self-guided programs, in addition to staff and partner-led interpretation, we are able to reach a larger audience, be more readily available, and allow visitors to explore at their own pace while still allowing for discussion and providing answers to questions. Current efforts include on and offsite talks and tours, as well as written information provided through informational signs, brochures, and refuge Web sites. We use visitor and program attendee feedback to evaluate the effectiveness of our activities.

Service policy (605 FW 7) defines interpretive programs as management tools to accomplish the following:

- Provide opportunities for visitors to become interested in, learn about, and understand natural and cultural resource management and our fish and wildlife conservation history.
- Help visitors understand their role within the natural world.
- Communicate rules and regulations to visitors, thereby promoting understanding and compliance to solve or prevent potential management problems.
- Help us make management decisions and build visitor support by providing insight into management practices.
- Help visitors enjoy quality wildlife experiences on the refuge.

Further, the new policy provides these guiding principles for interpretive programs:

- Relate what is being displayed or described to something within the personality or experience of the visitor to provide meaningful context.
- Reveal key themes and concepts to visitors based on information.
- Inspire and develop curiosity.
- Relate enough of the story to introduce concepts and ideas and pique visitor interest, discussion, and investigation so that visitors develop their own conclusions.
- Organize activities around theme statements.

We strive to follow those principles, which will serve to enhance visitors' understanding of the area's significant resources, as well as the important role the refuge plays in their conservation.

Another effort underway related to interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released for public review and comment the draft

Comprehensive Management Plan and EA for this trail. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes. The final plan was approved in February 2011.

The NPS is working with many partners to plan, develop, and manage the trail, including other national wildlife refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with this CCP.

Strategies

Continue to

- Distribute general refuge brochure and post at kiosks.
- Maintain interpretive and other pertinent refuge information at the three kiosks located at the Woodmarsh Trailhead, the Woodmarsh Trail near Sycamore Road, and the Great Marsh Trailhead.
- Install interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities.
- Work with the Mason Neck State Park to participate in interpretive events.
- Coordinate with the NPS to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.
- Work with the Mason Neck Managers Group in constructing a joint agency kiosk on Gunston Road near the entrance to the Mason Neck Peninsula to orient visitors and tell the story about each agency. This kiosk should
  - Contain a map of the area including respective agency lands; and
  - Information about the purposes and management of each agency, recreational opportunities, and regulations for each area.

Over the 15 years of CCP implementation:

- Develop a Visitor Services step-down plan to address the Service's and Refuge System missions, refuge purposes, infrastructure, and specific Service and Regional emphases. Include the following:
  - Interpretation of bald eagle biology and exploring options for meeting visitor expectations of seeing eagles without disturbing them.
  - Installation of interpretive panels along trails to explain refuge resources and management activities, and to enhance self-guided interpretive opportunities.
  - Clarification in materials distinguishing Mason Neck State Park and refuge through various forms of media, programming, and standardized signing.

- ✺ Explanation of what is a compatible, wildlife-dependent public use and why that is a priority for the Refuge System.
- ✺ Interpretation of management practices through various forms of media and in clear terms for urban visitors.
- ✺ Addressing law enforcement issues relating to visitor safety and resource protection through interpretive programming.
- ✺ Initiate a Refuge Watch Program for the public to report crimes and criminal activity.
- ✺ Provide access to quality materials via a Refuge Complex Web site.

- Assess refuge signs to add, move, replace, or update them to conform to Regional Service sign standards and be consistent with Refuge Complex sign plan. Install appropriate welcome and directional signs, trailblazer signs, trailhead signs, waysides, and other required signs.
- In coordination with VDOT, install standard State highway directional Trailblazer signs to the refuge on I-95 and U.S. Route 1.
- Explore option of using trained volunteers and Friends Group members to conduct onsite and offsite interpretive programs and interpretive walks.
- Explore option of installing a Travelers Information System on Mason Neck Peninsula. This AM radio station and frequency will be dedicated to broadcasting general, emergency, and interpretive information about the refuge and Mason Neck State Park.

Objective 3.6 Environmental Education Program

Enhance environmental education opportunities on the refuge by rehabilitating outdoor education facilities and increasing education partnerships and educator-led programs.

Rationale

The Refuge Improvement Act identifies environmental education as a priority wildlife-dependent recreational activity. It teaches students of all ages the history and importance of conservation and ecological principals and scientific knowledge of our Nation's natural resources. Through that process, we can help develop a citizenry that has the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively toward the conservation of our Nation's environmental resources.

We have not actively pursued an environmental education program on the refuge in recent years due to limited staffing and funding. As discussed earlier in this chapter, our Region made a difficult decision at each refuge regarding which two of the six priority public uses would receive management emphasis to make efficient use of what funding and staffing was available. Although it was determined that wildlife observation and interpretation are the priorities for this refuge, the refuge has valuable resources that offer excellent environmental education opportunities.

Our program to date has been limited to providing access for teacher-led research projects by students from Thomas Jefferson High School. While we facilitate these programs, we do not otherwise design or implement programs.

Additional staffing and funding will allow us to be more proactive in developing a core environmental education program in conjunction with the facilities and

programs of Mason Neck State Park, as well as through rehabilitation of our own educational facilities on Sycamore Road.

Strategies
Continue to
- Allow Thomas Jefferson High School to conduct environmental educational activities on the refuge including vernal pool studies and deer pellet counts.
- Facilitate other environmental education opportunities and programs upon request.

Over the 15 years of CCP implementation:
- Partner with Mason Neck State Park to integrate education programs into the existing teachers workshops being offered at the park's Visitor Center.
- Provide information to educators upon request that supports State curriculum standards and emphasizes key themes related to habitat management for bald eagles and great blue heron, and regional and national themes such as connecting children to nature and global climate change.
- Rehabilitate the old environmental education site and trail for use by teacher-led groups.
- Encourage Friends Group and volunteers to work with county agencies, local schools, and other educational institutions to enhance utilization of refuge resources for educator-led environmental education programs. Support development of basic lesson plans with these partners.
- Support use of the refuge by Fairfax County School District.

GOAL 4: **Enhance efforts to promote public awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 4.1 Volunteers Improve the refuge's volunteer program by expanding the amount and types of meaningful and engaging opportunities that support refuge goals and objectives.

Rationale
Volunteers, Friends organizations, and other partners are essential allies for many programs within the Service. Every day, these devoted individuals and organizations play vital roles in helping the Service fulfill its mission and many of our important conservation goals. Each year, volunteers, Friends organizations, and partners generously give time, expertise, and resources to the Refuge System, fish hatcheries, and other Service offices. They play an important role in helping serve over 40 million visitors who enjoy our public lands.

Volunteers help the Service in a variety of ways. Some work full-time, while others assist a few hours a week or month or during special events. Nationally, many volunteers conduct fish and wildlife population surveys, band ducks, lead tours, provide information to school groups and other visitors, assist with laboratory research, work on cultural resources projects, perform clerical and administrative duties, work with computers and other technical equipment, and much more.

Our 40 or so volunteers over the past 3 years have spent between 300 and 800 hours annually on different activities at Mason Neck Refuge, including wildlife and habitat, maintenance, and recreation support. Maintaining this level of volunteer support is critical to continuing to maintain our refuge programs.

We will have an opportunity to expand our volunteer program with the additional staffing and funding recommended. These additional resources will allow us to implement many of the strategies we have identified in support of our biological and public use objectives.

Strategies
Continue to
- Enlist the help of volunteers on an opportunistic basis to support refuge programs.
- Develop community service projects to support Fairfax County court system.
- Have volunteers from the community assist in refuge cleanup activities, special events, routine maintenance of trails, roads, and other areas, invasive plant control, and bald eagle and other bird counts.
- Develop projects for Boy and Girl Scouts upon request.
- Issue the monthly Refuge Complex volunteers newsletter to identify current and upcoming events.
- Develop and implement annual volunteer recruitment, training, and appreciation and recognition events.

Over the 15 years of CCP implementation:
- Increase the number of volunteers though development of quality, well-organized projects.
- Use citizen science volunteer groups to conduct biological baseline studies and monitoring consistent with Service protocols.
- Coordinate with other agencies on Mason Neck Peninsula to recruit, train, and share volunteers.
- Use volunteers and Friends Group members as docents to lead interpretive walks and as general guides during peak use times (also see objective 3.5).
- Use refuge training funds to provide special technical training to qualified volunteers to enhance their capability to assist in refuge programs.
- Address desires of refuge neighbors to participate in refuge management through volunteer opportunities.
- Pursue a resident volunteer program (e.g., a retired couple). Partner with another agency on the Mason Neck Peninsula or in the region, if necessary, to find a suitable location for housing volunteers. For example, this may be accomplished through a cooperative agreement with the NVRPA at Pohick Bay Regional Park.

Objective 4.2 Community Outreach

Ensure more than 50 percent of the adults contacted within Fairfax County will understand the importance of conserving wildlife, habitats, and cultural resources on the refuge, will know that the refuge is part of a national system of wildlife refuges, are aware of the wildlife-dependent recreational opportunities available on the refuge, and plan to visit the refuge or actively participate in refuge programs or volunteer projects within the next year.

Rationale
It is important to build a strong base of public understanding, support, and activism beyond the portion of the American public who visit refuges. To achieve this, the Service has actively supported nationwide strategies, partnerships, legislation, and departmental mandates with a strong emphasis on outreach. These include the 100-on-100 Outreach Campaign, the National Outreach Strategy: A Master Plan for Communicating in the U.S. Fish and Wildlife Service, the Cooperative Alliance for Refuge Enhancement (CARE), the Volunteer and Community Partnership Act, and the Challenge Cost-Share Program.

We are particularly interested in outreach to the local communities in Fairfax County and the Washington D.C. metropolitan area. We desire to be a welcomed and valued asset to those communities. A positive community relationship is a crucial link between public support for refuges and effective management of the Refuge System. We are aware that there are many residents who either do not know that a national wildlife refuge is nearby, or do not recognize its regional importance to the Potomac River and Chesapeake Bay ecosystems. Our current outreach program consists of news releases, participating in community events, and giving presentations to local organizations.

We are striving for a well-rounded program of public outreach to enable large and diverse segments of the public to learn about the importance of refuge wetland and upland habitats, species of conservation concern, cultural resources, refuge management, and the refuge's role in the Refuge System. An effective public outreach program can also help win friends and proactively deal with controversial refuge management activities. This program can be used to anticipate and avoid potential conflicts between the needs of wildlife and other refuge uses.

We believe that regular communication within the community is very important. News articles and personal appearances inform our neighbors about what we are doing and why, which could lead to increased understanding, appreciation, and support of our programs. The feedback we receive from these outreach efforts allows us to better understand issues that are important in our communities, and how our management may affect them.

We also believe that actively engaging people in meaningful refuge programs or projects will make a more lasting impression. We offer many opportunities for people to get involved. Partners, volunteers, and members of the Friends of Potomac River Refuges are vital to accomplishing our outreach activities. They assist us in community events and refuge visitor programs, as well as support the gathering of data and maintenance projects. This assistance supports us in meeting the refuge's goals and objectives, supports the missions of the Refuge System and the Service, and fosters good community relationships.

Strategies
Continue to
- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities.

- Routinely respond to written, telephone, and in-person inquiries from the public.

- Maintain, and regularly update, contact information for the media and the general public.

- Inform refuge neighbors of refuge management activities via the Web site, press stories, and newsletters.
- Promote our successes in the local community via refuge and community events, project demonstrations, and media stories.
- Utilize volunteers to participate in community events in Fairfax County where effective outreach of refuge programs can occur.
- Continue to maintain Web site with links to newsletters, the Potomac River Refuge's Friends Group, and other pertinent refuge information.

Over the 15 years of CCP implementation:

- Develop and implement procedures to offer refuge "behind the scenes" tours to the media and the general public.
- Create and maintain refuge-specific fact sheets.
- Expand refuge outreach programs to include recognized events such as, but not limited to, International Migratory Bird Day and National Wildlife Refuge Week, and designed to promote wildlife-dependent recreation and natural resource education.
- Work towards more informed and productive relationships with the local media. Establish personal contacts at all local media outlets, including radio and television stations.

Objective 4.3 Partner Outreach

Continue to foster and enhance cooperation and communication with other State and Federal agencies, museums, civic organizations, and environmental and conservation groups to promote and advance the Refuge System mission and refuge goals, and identify mutually beneficial outreach projects and activities.

Rationale

Beyond the Friends of Potomac River Refuges and our volunteers, we have many other partners who help us conduct outreach within professional, academic, non-governmental organizations, and government agency arenas. This is generally achieved through means such as professional or agency meetings and presentations, publications, and refuge tours. We identify many of these partners in goals 1 and 2.

These partners include several government and local agencies active in the refuge area who share in the responsibility to conserve natural resources. Among them are BLM, NPS, USDA–National Resource Conservation Service, VDGIF, NVRPA, VDEQ, Virginia State Parks, Virginia Native Plant Society, Northern Virginia Chapter – Delta Waterfowl, Virginia Council on Indians, Audubon Society of Northern Virginia, Virginia Institute of Marine Science (VIMS), VNHP, planning district commissions, historical preservation commissions, soil and water conservation district commissions, chambers of commerce, Fairfax County government, and others. We plan to continue to work closely with some of these entities to achieve mutual outreach objectives.

We also plan to continue our collaborations with educational and research institutions to facilitate their research and investigations that help us seek answers to important natural resource issues on the refuge and within the Refuge System and to contribute our basic understanding of important natural resource issues worldwide.

Encouraging relationships with non-governmental conservation organizations active in the Potomac River Basin and Chesapeake Bay region will also be

important in our overall outreach strategies. Examples of these groups include the Potomac River Naturalists, Chesapeake Bay Foundation, the Potomac River region members of the Gateways Network, Alliance for the Chesapeake Bay, and Fairfax Watershed Network.

Strategies
Continue to
- Maintain contact list and ensure regular contact with local groups, environmental groups, and other interested parties active in the Mason Neck Refuge area.

Over the 15 years of CCP implementation:
- Review existing partner relationships to determine if outreach, or the dissemination of information, could be more collaborative and effective.
- Review Fairfax County Tourism, Gunston Hall, and other local community organization's events schedules to see if the refuge has a role or contribution.
- Seek out new partnership opportunities with museums, historical and botanical groups, civic organizations, and environmental and conservation groups to achieve mutually beneficial projects and activities.
- Improve coordination and sharing of resource information with State agencies, including VDGIF, VNHP, and the SHPO.

Objective 4.4 Elected Official Outreach

Continue to inform elected officials representing the refuge area about refuge management priorities and special events and activities on an annual basis or as significant issues arise.

Rationale
Gaining support from Federal, State, and local elected officials is essential to meeting our goals. This can only happen when these elected officials are fully informed and understand and appreciate the significant contribution of the refuge to the Refuge System and the quality of life and conservation of Federal trust resources in Virginia. We regularly inform elected officials about upcoming refuge events and have encouraged them to visit to learn more about the refuge on several occasions. Additional staffing will allow us to increase our elected official outreach efforts to promote Mason Neck Refuge.

Strategies
Continue to
- Invite Federal, State, and local elected officials to attend outreach events held on the refuge.
- Provide written or personal briefings for members of Congress and their staffs, as needed or as requested, to inform them about important refuge issues.

Over the 15 years of CCP implementation:
- Invite Federal, State, and local elected officials to attend a guided tour of the refuge, to showcase particular accomplishments, view outstanding natural resource areas, demonstrate management activities, and highlight challenges.

Objective 4.5 Research

Enhance research partnership opportunities to exchange information for making science-based management decisions and to support regional projects of interest to the Service.

Rationale
We can benefit from targeted research conducted by colleges and universities, such as George Mason University, Virginia Tech, University of Virginia, Virginia Commonwealth University, and the College of William and Mary. Research often can answer complex questions about refuge management issues and add to the wealth of scientific knowledge upon which decisions about current and future resource issues will be based.

We plan to take a more proactive role in working with partners to identify and promote, and seek funding for research projects focused on resource issues at Mason Neck Refuge. Disseminating research results, so that others will benefit from what we have learned, will also be a priority.

Strategies
Continue to
- Support inventories and research led by others, such as the MAPS station, which are a priority for the refuge and compatible with refuge purposes, goals and objectives. Use both refuge staff and volunteers to support efforts as funding allows.

Over the 15 years of CCP implementation:
- In cooperation with State agency and conservation partners, identify the highest priority research and inventory needs for the refuge and the Mason Neck Peninsula, which will further conservation and management of Federal trust resources. Refer to all proposed research and inventory and monitoring projects identified under the biological goals and objectives in CCP.

- With priority research needs identified, work with partners to develop project-specific research goals, study design, and methodology, and opportunities for alternative sources of funding.

- Facilitate the publication and dissemination of refuge research results. Consider opportunities to write for lay audiences to the extent possible, in addition to the scientific community.

GOAL 5: Enhance efforts to protect and interpret refuge cultural resources.

Objective 5.1 Archaeological Resources

Raise awareness about the importance of protecting archaeological resources and enhance efforts to preserve these resources on the refuge from damage by shoreline erosion and visitor foot traffic.

Rationale
Cultural resources that illuminate the pre-contact life of Native Americans at Mason Neck Refuge are Federal trust resources that we must protect and use to educate the public. Some of the peninsula's earliest known inhabitants were Native Americans of the Early Archaic period, over 9,000 years ago. The first recorded history of the area is from Captain John Smith, who wrote of his meeting with Dogue Indians in 1608 and charted the chief's village of Tauxenent on his map of Virginia. The area was at times referred to as Doggs Island and Doeg Neck, until the Mason family lived on the peninsula (Lutz, 2003). Additional staffing and funding will allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the archaeological heritage and environmental history of the refuge to the public. Appendix F provides an overview of known resources on the refuge.

Strategies
Continue to
- Limit public access to designated trails in certain areas to keep visitors away from known archaeological sites on the refuge.

Bill Wallen

Entrance sign at Mason Neck Refuge

- Coordinate with the Service's regional archaeologist to determine the level of consultation required in conjunction with refuge projects that have a potential to affect archaeological resources.
- Conduct archaeological reviews, surveys, or studies of project areas, as needed or recommended by the Service's regional archaeologist.
- Monitor known archaeological sites for looting and trespass.

Over the 15 years of CCP implementation:

- Complete refugewide inventory with GPS data for known archaeological sites and resources.
- Work with State and county archaeologists and avocational archaeological societies willing to assist in performing targeted surveys with subsurface testing, and to locate and evaluate shoreline sites at risk. Ensure archaeological resources are protected from looting. Develop site management and protection plans, as warranted.
- Ensure that at least one law enforcement staff person receives ARPA training.
- Facilitate research on the refuge to achieve cultural resource protection and conservation objectives.
- Use the new proposed Sycamore Trail as an opportunity to interpret archaeological sites.
- Raise awareness of the importance of protecting archaeological resources, and interpret the existing archaeological resources through outreach and interpretive information and programs.
- Design any new refuge trails, overlooks, or other amenities to avoid impacts to archaeological resources.

- Conduct targeted surveys with subsurface testing to identify more of the many unrecorded sites likely to be on the refuge and to evaluate their condition and any threats.

- Ensure that an ARPA message is incorporated into refuge brochures and on interpretive signs at trailheads, including those produced by refuge partners.

- Work with the Virginia Council on Indians to develop interpretation, education, and outreach materials and programs related to the refuge's cultural resources.

Objective 5.2 Historical Resources

Protect historical resources on the refuge from damage by visitors, while also increasing opportunities to engage visitors through interpretation and education to instill an appreciation and promote stewardship of these resources.

Rationale

There is a rich legacy of post-contact history along the Potomac River shoreline. Mason Neck Peninsula was patented by adventurers in the mid-1600s who traveled up both sides of the peninsula via the Occoquan River and Pohick Creek, and gained familiarity with the lands in-between. In 1755, George Mason IV, author of the Virginia Declaration of Rights, built his home on the peninsula. This Georgian house, known as Gunston Hall Plantation, is on the National Register of Historic Places and is open to the public for tours. A 2,300-acre plantation owned by George Mason V included lands on both the refuge and adjacent Mason Neck State Park. Many historians and archaeologists have studied the homesite (Lutz, 2003). While 15 historical archaeological sites are recorded on the refuge, at present, none have been formally listed on the National Register (see appendix F).

Additional staffing and funding will allow us to upgrade our stewardship of cultural resources on the refuge and support enhanced interpretation of the post-contact history and related changes in the natural environment of the refuge for the public.

Strategies

Continue to

- Limit public access to designated trails to keep visitors away from historic sites on the refuge.

- Provide interpretation of historic importance of refuge in refuge brochures and kiosks.

- Monitor known historical sites for looting and trespass.

Over the 15 years of CCP implementation:

- Use new Sycamore Trail as an opportunity to interpret historic resources on the refuge with sensitivity to ensure they remain protected.

- Work with Mason Neck State Park and Gunston Hall to develop appropriate historical resources brochures and signage.

- Raise awareness of the importance of protecting historical resources, and interpret the existing historical resources through outreach and interpretive information and programs.

- Work with the Virginia Council on Indians to develop interpretation, education, and outreach materials and programs related to the refuge's cultural resources.

Part Two—Featherstone Refuge Management

Introduction

The Service will build off the wildlife and habitat actions already occurring under current management. Increased emphasis will be on monitoring and protecting sensitive areas from human disturbance, such as the refuge shoreline and riparian forest habitats. We will work with partners to develop shoreline protection measures and address climate change impacts. In addition, monitoring and controlling invasive plants, pests, and pathogens to avoid catastrophic loss or degradation of habitat will remain a priority. As funding, staffing, or partner assistance allows, we will also collect refuge habitat data, such as locations of vernal pools and nesting sites, to include in a GIS database. Research by partners will also be encouraged to support refuge goals and objectives, enhance our understanding of Federal trust resources, or address issues of concern.

The Service will continue to pursue and evaluate options with Prince William County and other stakeholders to secure public parking, and safe and legal public access to the refuge–an issue since the refuge was established. In addition, many stakeholders are seeking a means to establish a segment of the PHNST on the refuge, contributing to a concept of a continuous network between the Mount Vernon Trail (in southern Fairfax County) and Prince William Forest Park.

Once public access is secured and we have additional staff to effectively manage a visitor program, we will provide opportunities for wildlife observation and nature photography on designated refuge trails and fishing at designated sites. New proposed infrastructure construction will be contingent on available funding. Map 4.3 depicts potential locations for new public use infrastructure. With additional staff in place, we will also evaluate, in detail, a proposal to provide opportunities for hunting in cooperation with VDGIF. Other alternatives, including no action, will be considered in the hunt program evaluation, and there will be public involvement before making a final decision.

General Refuge Management

There are some common actions we will undertake in managing Featherstone Refuge over the next 15 years. Some actions are required by law or policy, or they may be administrative actions that do not necessarily require public review, but we want to highlight them in this public document. They may also be actions we believe are critical to achieving the refuge's purpose, vision, and goals. Those actions are the following:

- Coordinating with refuge partners, the Friends of Potomac River Refuges, and the Prince William County community
- Protecting federally listed and recently de-listed species
- Controlling pest plants and animals
- Monitoring and abating wildlife diseases
- Supporting research and investigations
- Distributing refuge revenue sharing payments
- Protecting cultural resources

Coordinating with Refuge Partners, Friends of Potomac River Refuges, and the Prince William County Community

We will continue to inform and coordinate with our refuge partners, including the Friends of Potomac River Refuges, VDGIF, and Prince William County, in continuing efforts to protect the integrity of refuge wildlife and habitats, and to identify opportunities for engaging the local community in stewardship of refuge resources.

Protecting Federally Listed and Recently De-listed Species

The bald eagle was recently removed from the Federal list of threatened and endangered species. However, it remains a focal species for the refuge and it continues to be protected under the MBTA and the Bald and Golden Eagle Protection Acts, as well as State law. We will continue to protect bald eagles as a priority on the refuge. There are currently no active nesting pairs on the refuge; the last nesting pair documented was in 1996. However, at least one pair has

Map 4.3. Planned Public Use Features at Featherstone Refuge

been active in the vicinity of the refuge since the early 1990s. We will continue to work cooperatively with VDGIF to monitor for nesting and breeding activity and prohibit the public from disturbing them.

The Service has identified one federally listed aquatic invertebrate, the dwarf wedgemussel (endangered), and three federally listed plants—sensitive joint-vetch (threatened), small whorled pogonia (threatened), and harperella (endangered)—as occurring in Prince William or adjacent counties. None, however, have been documented on the refuge. The dwarf wedgemussel is known to occur in the Lower Potomac watershed downriver from Featherstone Refuge. It is possible that one of these four listed species may be present on the refuge. We will continue to support partner-led efforts to survey for them. If located, we would work with the respective species' Recovery Team, VNHP, and other experts to develop protection measures.

Controlling Pest Plants and Animals

The establishment and spread of invasive plants is a significant problem that reaches across all habitat types. The unchecked spread of invasive plants threatens the biological diversity, integrity and environmental health of all refuge habitats. In many cases, these plants have a competitive advantage over native plants and form dominant cover types, reducing the availability of native plants as food and cover for wildlife. There are many plans, strategies, and initiatives targeted toward more effective management of invasive species, including *The National Strategy for Management of Invasive Species* for the National Wildlife Refuge System (2003), *Silent Invasion—A Call to Action* by the National Wildlife Refuge Association (2002), and *Plant Invaders of Mid-Atlantic Natural Areas* by the Service and the National Park Service (2002). Guidance for managing invasive species on refuges is found in the Service Manual (620 FW 1.7G).

We, or our partners, will continue to treat invasive plants as needed using mechanical (e.g. mowing or trimming), biological, and hand-pulling methods, as well as herbicides. Only herbicides approved by the Regional Contaminants Coordinator will be used, and only in accordance with approved rate and timing of application. Consideration of impacts on target and non-target species is part of the approval.

With regards to pest animal control, we, or our partners, will continue to use both non-lethal and lethal control measures, as warranted. Similar to our discussion under Mason Neck Refuge, we are concerned and remain vigilant about forest pests such as gypsy moth and emerald ash borer and take action as warranted to control their spread. Lethal control of pest animals will only be conducted by refuge staff, their agent, or contractor to achieve a management objective. As such, control activities are considered a management or administrative activity and not subject to compatibility review.

Monitoring and Abating Wildlife Diseases

The Service Manual chapter on Disease Prevention and Control is not yet published. Until it is, we derive guidance on this topic from the Refuge Manual and specific directives from the Director or the Secretary. Refuge Manual 7-RM-17.3 lists three objectives for disease prevention and control:

1) To manage wildlife populations and habitats so the likelihood of disease contraction and contagion are minimized

2) To provide for early detection and identification of disease mortality when it occurs

3) To minimize losses of wildlife from disease outbreaks

These objectives were published in 1982. Since that time, in addition to diseases that cause serious mortality among wildlife, significant attention has been given to those diseases that are transmitted through wildlife to humans. For example, Lyme disease transmitted by ticks, and West Nile virus transmitted by mosquitoes.

A serious wildlife disease receiving considerable attention worldwide is avian influenza. Of particular concern is the highly pathogenic Eurasian form (H5N1). In 2006, all refuges were instructed to prepare an Avian Influenza Surveillance and Contingency Plan. The plan covering the Refuge Complex was approved in July 2006 (USFWS, 2007a). It discusses methods for dealing with this disease should it ever be identified on the refuge.

Another disease of significant concern to both the Service and VDGIF is CWD. It attacks the brain and spinal cord of deer, elk, and moose, and is typically fatal. While the exact cause is unknown, it is believed to be caused by a prion, an altered protein that causes other normal proteins to change and cause sponge-like holes in the brain. CWD was first identified in the 1960s in a Colorado research facility, and since that time it has been found in Wisconsin, Wyoming, Nebraska, New Mexico, South Dakota, Illinois, Utah, Kansas, Minnesota, Montana, Oklahoma, New York, West Virginia, and Canada. Prion diseases, like CWD, do not move easily between species. There is no scientific evidence that CWD has been transmitted to animals other than deer, elk, and moose. There is also no evidence that any human has ever been infected with CWD.

The VDGIF is conducting active surveillance for CWD during deer hunting seasons. To establish whether CWD occurs in Virginia, VDGIF began Statewide CWD surveillance in 2002. Deer have been sampled from every county in the Commonwealth. In January 2010, the VDGIF confirmed the first case of CWD in Virginia (VDGIF 2010). It was detected in a white-tailed deer killed by a hunter in Frederick County, near the West Virginia State line. VDGIF recommends that people take precautions to avoid exposure to animals infected with CWD. Specifically, they recommend not consuming meat from any deer that appears abnormal, sick, or is known to be infected with CWD. They also recommend wearing gloves when dressing and boning deer meat. For more detailed information on VDGIF's response to chronic wasting disease, you can access their Chronic Wasting Disease Response Plan at *www.dgif.virginia.gov/cwd* (accessed June 2011). We also developed a CWD plan for the Refuge Complex in 2006 and will continue to communicate and coordinate with VDGIF to monitor for the presence of the disease on and near the refuge.

Supporting Research and Investigations

Guidance on conducting and facilitating research and investigations on refuges is found in the Refuge Manual and the Service Manual. In 1982, the Service published three objectives for supporting research on units of the Refuge System in the Refuge Manual (4 RM 6.2):

1) To promote new information and improve the basis for, and quality of, refuge and other Service management decisions

2) To expand the body of scientific knowledge about fish and wildlife, their habitats, the use of these resources, appropriate resource management, and the environment in general

3) To provide the opportunity for students and others to learn the principles of field research

In 2006, the Service Manual (603 FW 1.10D (4)) provided supplemental guidance on the appropriateness of research on refuges, as follows: "We actively encourage cooperative natural and cultural research activities that address our management needs. We also encourage research related to the management of priority general public uses. Such research activities are generally appropriate. However, we must review all research activities to decide if they are appropriate or not as defined in section 1.11. Research that directly benefits refuge management has priority over other research."

All research conducted on the refuge by others must be determined in writing by the refuge manager to be both appropriate and compatible before a special use permit is issued to allow the activity. As noted in chapter 3, we have found several research projects to be appropriate and compatible. We expect that additional opportunities to conduct research on the refuge will arise in the future. In making determinations on the appropriateness and compatibility of future research proposals, we will follow guidance in the Refuge and Service Manuals and will employ the following general strategies:

- Seek qualified researchers and funding to help answer refuge-specific management questions.
- Participate in appropriate multi-refuge studies conducted in partnership with the USGS.
- Facilitate appropriate and compatible research by providing temporary housing and equipment, if available, for persons conducting field work.
- Pursue peer-reviewed publications of research, and/or ensure the Service is acknowledged as a contributor in research conducted on the refuge by others.

Generally, we will approve permits for research projects that provide a direct benefit to the refuge or that will strengthen our decisions on managing natural resources or public use programs on the refuge. The refuge manager also may consider requests that do not relate directly to refuge objectives, but instead relate to the protection or enhancement of native species and biological diversity in the region and support the goals of ecoregional conservation plans, such as the ACJV.

All researchers will be required to submit detailed research proposals following the guidelines established by Service policy and refuge staff. Special use permits will also identify the schedules for progress reports, the criteria for determining when a project should cease, and the requirements for publication or other interim and final reports. All publications will acknowledge the Service

USFWS

Magnolia warbler

and the role of Service staff as key partners in funding and/or operations. We will ask our refuge biologists, other divisions of the Service, USGS, select universities or recognized experts, VNHP, and the VDGIF to peer review and comment on research proposals and draft publications, and will share research results internally with these reviewers and other conservation agencies and organizations. To the extent practicable, and given the publication type, all research deliverables will conform to Service graphic standards.

Some projects, such as depredation and banding studies, will require additional Service permits. The refuge manager will not approve those research projects until all required permits are received and the consultation requirements under the Endangered Species Act have been met.

Distributing Refuge Revenue Sharing Payments

As we described in chapter 3, we pay Prince William County refuge revenue sharing payments based on the acreage and the appraised value of Featherstone Refuge lands. These annual payments are calculated by a formula determined by, and with funds appropriated by, Congress and authorized under the Refuge Revenue Sharing Act (16 U.S.C. § 715s). Those payments will be continued in accordance with the law, commensurate with changes in the appraised market value of refuge lands or new appropriation levels dictated by Congress.

Protecting Cultural Resources

During the release of the public draft CCP/EA, we consulted with the Virginia SHPO regarding our proposed cultural resource management. In their response, the Virginia SHPO states they fully support our cultural resource management program and agreed it fulfills the Service's stewardship responsibilities under Section 110 of the National Historic Preservation Act (Eaton 2011 personal communication). We will continue to evaluate the potential for refuge projects to impact archaeological and historical resources, in consultation with the regional archaeologist and/or SHPO to ensure compliance with Section 106 of the National Historic Preservation Act. That compliance may require any or all of the following: a State Historic Preservation Records survey, literature review, or field survey. In addition to surveys and reviews, we will also seek to minimize adverse impacts to eligible archaeological sites through public access restrictions and monitoring by law enforcement. For all archaeological sites on the refuge, preservation in place is our preferred treatment.

Conducting Additional NEPA Analysis

For all major actions, NEPA requires site-specific analysis and disclosure of their impacts, either in an EA or an EIS. Most of the major actions in this CCP were fully analyzed in the draft CCP/EA and are described there in enough detail to comply with NEPA, and do not require additional environmental analysis. Although this is not an all-inclusive list, the following project examples fall into this category: conducting biological inventories and monitoring, pursuing safe public access to refuge lands and legal parking to facilitate compatible public use on the proposed trails, constructing proposed public use facilities, and controlling invasive plants and animal pests.

Although we analyzed the impacts of most management actions in the draft CCP/EA, additional or supplemental NEPA analysis will be necessary for certain types of actions. An example of this is our proposal to evaluate the need for, and feasibility of, shoreline protection projects at Featherstone Refuge. Should we determine a proposed action that requires major construction to protect the shoreline at Featherstone Refuge, we will conduct a detailed NEPA analysis, including public involvement, before a decision on a particular design is reached. Similarly, if we pursue a hunt program for Featherstone Refuge, we will conduct a detailed NEPA analysis, including public involvement, before a decision is made. In either case, these are management actions whose precise details and, therefore, consequences cannot be known by the Service at this time.

Featherstone Refuge Goals, Objectives, and Strategies

Detailed Objectives and Strategies to Meet Refuge Goals

GOAL 1: **Protect forest, wetland, and shoreline habitats to support native wildlife and plant communities, including species of concern.**

Objective 1.1 Mature Hardwood-mixed Forest Habitat and Associated Native Wildlife

Monitor habitat conditions and protect sensitive areas from human disturbance on the refuge's 80 forested acres, with emphasis on nesting bald eagles, migratory birds, and other species of conservation concern identified in the Virginia Wildlife Action Plan.

Rationale

Sustaining a contiguous, healthy, and diverse mature hardwood-mixed forest on Featherstone Refuge contributes to migratory bird conservation due to the refuge's location in a highly urbanized area. Remaining coastal forests and woodlands within BCR 30, like those on the refuge, provide stopover sites during migration and overwintering for neotropical migrants (Steinkamp, 2008). Within BCR 30, forested upland communities provide habitat for the second highest number of priority bird species in the region (USFWS, 2007). Destruction and fragmentation of forests in both breeding and wintering areas are factors in the decline in forest bird species abundance (Roth et. al., 1996). Many of these declining species are also associated with dense understory conditions created by local disturbance. These conditions have become less common due to a lack of forest management and overbrowsing by white-tailed deer (Rich et al., 2004).

Management at Featherstone Refuge will be focused on protecting habitat for bald eagles and other migratory birds of conservation concern. Because of its size, the refuge only minimally contributes to conserving habitat for FIDs and other neotropical bird species which are regionally declining due to habitat loss and fragmentation. FIDs species require large contiguous forested tracts to maintain viable populations. These species require a minimum habitat patch size of at least 50 acres in size with 10 or more acres of "forest interior" habitat (i.e., forest greater than 300 feet from the nearest forest edge) (Jones et al., 2000). However, the 50-acre minimum habitat patch size is only capable of supporting less area-sensitive FIDs species; more area-sensitive species require larger continuous forest patches. Larger patches also increase the probability of supporting a diversity of productive breeding pairs.

FIDs such as wood thrush, Acadian flycatcher, and scarlet tanagers are known to occur on the refuge and are listed as birds of conservation concern by various authorities (appendix A). According to the PIF Area 44 Plan, the BCR 30 plan, and Virginia WAP, other birds of conservation concern that will benefit from a diverse, mature, mixed-deciduous forest include raptors such as red-shouldered hawk and cavity-nesting birds such as pileated and red-bellied woodpeckers (Rosenberg et al., 1999; PWCA, 2008).

Among a number of management recommendations for forest birds made in the BCR 30 Plan are the following:

- Increase and improve active management of forests to improve habitat quality within existing and high priority upland forest (e.g., loss of shrub layer).
- Manage upland forest communities to provide post-fledging habitat (e.g. a habitat mosaic, including shrubby areas and openings; targeted species is the wood thrush).

- Develop and implement programs to control invasive plant species.

Bald eagle conservation also continues to be a priority on the refuge since their protection was a key reason for refuge establishment. After four decades of protection under the Federal Endangered Species Act, the bald eagle was officially removed from the Federal list of endangered and threatened wildlife in 2007. However, they are still protected under the Eagle Act and the MBTA. Bald eagles also continue to be State-listed as threatened in Virginia.

The refuge shoreline provides important foraging and perching habitat for bald eagles. Although the refuge does not currently support any breeding pairs of bald eagles, it has previously and will hopefully do so again in the future as Virginia's eagle population continues to grow. There are active pairs in the vicinity of the refuge. The State's population has steadily increased from a low of 33 nests in 1970 to current numbers of nearly 550 pairs in Virginia's Coastal Plain, and over 1,000 pairs throughout the Chesapeake Bay region.

For more than 30 years, the VDGIF has cooperated with the Service, with academic and research partners—in particular, the Center for Conservation Biology (CCB) at the College of William and Mary—and with public and private landowners to achieve and document recovery of bald eagles. Both VDGIF and the Service remain committed to protecting bald eagles to ensure that a healthy population is sustained. Widespread urban sprawl and habitat destruction in the Coastal Plain pose serious risks to some of the region's best eagle nesting, foraging, and roosting habitat. To address these and other threats, both agencies have developed management guidelines: the Virginia Bald Eagle Management Guidelines (2007) and the Service's National Bald Eagle Guidelines (2007). We will support VDGIF in implementing both agencies' guidelines as they apply to Featherstone Refuge.

John Mosesso, Jr./NBII

Eastern box turtle

The refuge's forests also provide habitat for native mammals, amphibians, and reptiles. Appendix A presents a listing of all species known or suspected to occur on the refuge. Of the reptile species that are likely to occur, three are listed by the Virginia WAP as species of conservation concern, including the eastern hog-nosed snake (Tier IV), spotted turtle (Tier III), and eastern box turtle (Tier III).

Strategies

Continue to

- Cooperate with VDGIF and CCB in monitoring bald eagle activity on the refuge.

Over the 15 years of CCP implementation

- Identify potential habitat improvements for bald eagle, waterfowl, or other migratory birds.

- Identify partners to conduct surveys of neotropical migratory birds and other birds of concern.

- Enlist USDA–FS, State or conservation organizations with ecological expertise, to conduct forest health and condition inventory and identify any significant threats.

- Map in GIS, and protect from adverse impacts, any vernal pools or other unique habitat features.
- Inventory invasive plant species and prioritize their treatment.
- Use chemical, mechanical, biological, hand-pulling, or prescribed fire treatments as warranted.
- Address injurious or nuisance wildlife as problems arise.
- Hire additional wildlife program staff (appendix E) to plan, implement, and monitor the refuge's biological program.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits, to measure our success with respect to our objectives. The results may trigger adjustments to management strategies, such as burning and selective removal, to achieve structural and species diversity of native forest species. Results may trigger a reevaluation or refinement of our objectives. Examples of monitoring or surveys that we may implement include:
  - Determine the need for white-tailed deer control by evaluating regeneration of native trees, shrubs, and forbs through vegetation surveys on species composition, abundance, and diversity.
  - To maintain desired quality and characteristics of forests for FIDS and other forest-dependent migratory birds, annually conduct scouting for invasive plant species. We will afford zero tolerance to species that are highly invasive and stand replacing. Occurrences or stands of more stable patches of invasive plants may be tolerated in the short term as long as their cumulative coverage is not more than five percent of refuge upland acreage, and fundamental objectives are not compromised.

Objective 1.2 Shoreline Protection, Wetlands, and Water Quality

Protect the refuge's 220 acres of wetlands and its 2.2 miles of shoreline to maintain their integrity and protect their habitat values.

Rationale

Adopting measures to monitor and evaluate shoreline erosion, and minimize other threats to the integrity of the shoreline, is important to protecting refuge lands. Once lost, attempting to restore segments of river shoreline would be tremendously expensive and may be infeasible. However, shoreline protection will be evaluated within the context of climate change and sea level rise to determine the feasibility of shoreline protection projects.

Minimizing impacts to water quality and wetlands is also vital to maintaining the integrity, and sustaining the health and diversity, of refuge habitats and wildlife populations over the long term. Water quality impacts may come from contamination in water draining the landward side, upgradient of the refuge, into Farm Creek and other smaller drainages, and from stormwater flows immediately adjacent to the refuge. From the Potomac River side, impacts may come from contaminants in the river water. The refuge has no water quality data regarding the upland side drainages. The tidal Potomac River is monitored by the EPA and surrounding jurisdictions for a variety of water pollutants and sources.

Section 303(d) of the Federal Clean Water Act requires Virginia to

1) identify waters, known as water quality limited segments where technology-based effluent limitations and other required controls cannot achieve water quality standards; and

2) for each listed water, establish TMDLs for pollutants preventing the attainment of water quality standards; and (3) offer an opportunity for public review and comment on the proposed TMDLs.

Featherstone Refuge is located in the Upper Tidal portion of the Potomac River. The Virginia Department of Environmental Quality (VDEQ, 2008) has identified the waters of the Potomac River Lower Tidal, Potomac River Middle Tidal, and Potomac River Upper Tidal on the State's 303(d) List as impaired by nutrients (1996), sediments (1996), toxins (PCBs found in fish tissue) (2002), and impacts to biological communities (2004 and 2006) (Potomac River Lower and Middle Tidal only). Additionally, the Potomac River Lower Tidal was listed as impaired by bacteria in 2004, the Potomac River Middle Tidal was listed as impaired by metals (cadmium, chromium, copper, and lead) in 1996, and the Potomac River Upper Tidal was listed as impaired by metals (copper) in 1996 and impacts to biological communities in the nontidal portions of the basin in 2006. A TMDL for fecal coliform to address the Potomac River Lower Tidal 2004 bacteria listing was approved by the EPA in 2005, a water quality analysis for cadmium, chromium, copper, and lead to address the Potomac River Middle Tidal 1996 metals listing was approved by the EPA in 2006, and a water quality analysis for copper to address the 1996 metals listing was approved by the EPA in 2006.

We will work with the VDGIF and other State agencies to address these water quality issues.

Strategies
Over the 15 years of CCP implementation

- Monitor areas of substantive loss and work with experts to determine the feasibility of projects to mitigate shoreline erosion and wetlands impacts, especially in the context of predicted sea level rise.

- Seek partners and funding to implement priority projects assuming they are practical, feasible, cost effective, and commensurate with resource values.

- Facilitate a citizen science-based water quality monitoring program if an interest and a long-term commitment are present.

- Work with VNHP and other experts to conduct inventories for rare, threatened, and endangered plants species on the refuge. Potential species include sensitive joint-vetch, Parker's pipewort, and river bulrush.

Monitoring Elements

- Conduct appropriate monitoring and survey programs, as funding and staffing permits. The following are all components of how we will measure our success with respect to our objectives, and the results may trigger adjustments to our management strategies, or trigger a reevaluation or revision to our objectives. Examples of monitoring or surveys that we may implement include:

  - Work with partners to monitor erosion rates along the refuge's shoreline and determine the areas in greatest need of protection.

  - Work in partnership with local universities, as well as State and Federal agencies, to establish baseline species and habitat information. Use baseline data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

Objective 1.3 Interjurisdictional and Federal Trust Fisheries

Support the Service's Fisheries Program, VDGIF, and other partners' efforts to manage, protect, and monitor interjurisdictional and Federal trust fisheries and other aquatic resources of conservation concern on the refuge and in surrounding waters.

Rationale

Interjurisdictional fisheries are freshwater, coastal, or marine fish populations managed by two or more states, nations, or Tribal governments because of their geographic distribution or migratory patterns (USFWS, 2002). In addition, the Regional Fisheries Program includes the following guidance,

> Interjurisdictional fisheries must be under the jurisdiction of and managed by two or more states, nations, or tribal governments. The general standard for inclusion in this category is the existence of an interagency management plan among two or more states, nations, or tribal governments, or other similar formal agreement that specifically identifies the native species or population of interest and identifies a role for the Fish and Wildlife Service; and the Fisheries Program has or intends to have a consistent commitment to species restoration as evidenced by approval by Regional Fisheries (or higher level within the Fish and Wildlife Service). Interjurisdictional species or populations not covered by such a plan or agreement will be considered on a case-by-case basis" *(http://www.fws.gov/northeast/fisheries/;* [accessed June 2011]).

The tidal Potomac River and tributaries support a diversity of interjurisdictional fish species that depend in part on the larger tributaries (including the Occoquan River and Neabsco Creek) the smaller streams that include Farm Creek, and the marshes along the Virginia shoreline for habitat. Interjurisdictional fish listed as species of concern by the VDGIF (VCWCS, 2005) include the shortnose sturgeon (a federally listed endangered species and a listed by VDGIF as Tier I), Atlantic sturgeon (Tier II), alewife (Tier IV), American shad (Tier IV), and American eel (Tier IV).

It will be important to coordinate the strategies in this objective with VDGIF, and other State and Federal agencies and organizations with jurisdiction or a mission to protect these resources. For example, the National Marine Fisheries Service (NMFS), and the Service's Fisheries Program Office in Virginia will be a key partners in meeting this objective, as will the PRFC, which regulates, and issues licensees for, all recreational and commercial fishing, crabbing, oystering, and clamming in the main stem tidal Potomac River. The PRFC also coordinates regulations with the MDNR, the VMRC, and VDGIF, and with the other Atlantic Coastal States through the ASMFC.

Strategies

Continue to

- Provide assistance, typically logistical, to research partners, upon request, to facilitate their research on fish and other aquatic species in the tidal Potomac River.

Over the 15 years of CCP implementation

- Assist VDGIF, NMFS, the Service's Virginia Fisheries Program office, and other Federal and State agencies, when needed, to address interjurisdictional fish issues related to the waters of the refuge and the Potomac River.

Monitoring Elements

- Work in partnership with local universities, as well as State and Federal agencies, to establish baseline water quality and aquatic species and habitat information. Use baseline data to assess the short-term and long-term impacts of management activities and adjust management protocols as necessary.

GOAL 2: **Provide compatible, wildlife-dependent recreational opportunities to increase the enjoyment and appreciation of the refuge's resources to visitors and nearby residents.**

Objective 2.1 Public Access

Continue to work with Prince William County and other stakeholders to establish safe public parking and access.

Rationale

As we described in chapter 3, we do not currently allow public access to the refuge because we are unable to provide parking and safe, legal access to the refuge. This is essential to implementation of visitor programs on this refuge. It is important to recognize, however, that once parking and legal access is secured, we will also need to construct trails in locations that minimize impacts to natural resources. Unfortunately, there are very few options to develop public access, given the refuge's location between a residential single-family area, an industrial park, a high density housing development, and an active railroad line. However, we will continue to actively explore all possibilities as we describe below.

We have heard recommendations to open the refuge to those who live within walking distance because these users would not require parking. We do not believe that providing this exclusive opportunity to only adjacent residents is in the best interest of the American public, nor an efficient use of our limited funding and staffing resources.

Given our interests in providing access by land to the general public, we are only aware of one viable option. This option focuses on the using the current VRE parking area and platform. This has the potential to provide parking for refuge users and safe access across the CSX railroad tracks. In addition, it presents an opportunity to construct a trail from the west side of the railroad tracks to the refuge boundary and along an old roadway that has the potential to become part of the PHNST.

We will continue to discuss with Prince William County, the NPS, and other stakeholders, all viable options for resolving the access and parking issue and establishing and maintaining a 1.1-mile segment of the PHNST through Featherstone Refuge. The PHNST includes 830 miles of existing and planned trail segments linking the mouth of the Potomac River to the Allegheny Highlands with the goal of providing "… a means to explore the origins and continuing evolution of the Nation" *(http://www.nps.gov/pohe/index.htm;* [accessed June 2011]). The NPS is the Federal agency providing oversight and coordination for the PHNST. The NPS is currently working on a Memorandum of Understanding with State and Federal partners to develop a regional trails plan in the vicinity of Featherstone Refuge. The refuge would consider becoming a signatory if there is potential to resolve the public access issue. As a multi-use trail (i.e., for foot and bicycle uses), the PHNST segment would likely require an improved surface constructed according to American Association of State Highway and Transportation Officials (AASHTO) standards.

Despite the limitation of access by land and in response to public comment, we have decided to offer non-motorized boat access at one designated site along Farm Creek. Also see objective 2.4 and map 4.3.

Strategies

- Over the 15 years of CCP implementation
- Support Prince William County in pursuing VRE and CSX Station parking and crossover and platform access, as well as other viable options to provide safe public access.

- With land access and parking secured, support the NPS and other partners in development of PHNST.
- Allow non-motorized boat access at one designated location on Farm Creek (see objective 2.4).
- Hire visitor service and maintenance staff as identified in staffing chart (see appendix E).

Objective 2.2 Hunting

Evaluate opportunities for a quality hunting program in partnership with VDGIF

Rationale
Members of the public and VDGIF have recommended we allow hunting on the refuge. Specifically mentioned to us are interests in waterfowl and deer hunting consistent with State seasons. At present, we have not developed a hunt program proposal to the extent that we have enough detail to conduct a NEPA analysis and involve the public. Instead, once we have additional staff in place, we will identify and analyze a detailed proposal, and involve the public, before making a decision.

Hunting, if approved, would provide a priority public use in an area where public hunting opportunities are rapidly declining as development increases. The Refuge Improvement Act specifically identifies hunting as a priority wildlife-dependent recreational activity on refuges. Our particular interest in evaluating a hunt program on this refuge is similar to our reason for offering one at Mason Neck Refuge; that is, we are concerned about the impacts on native vegetation and forest regeneration from deer overbrowsing. Any negative effects on the ecological integrity, diversity, and health of the forest habitat would cause us to consider hunting as a potential management tool to minimize harmful impacts.

Strategies
Within 15 years of CCP implementation
- Evaluate in detail a proposal to provide opportunities for hunting consistent with State seasons in partnership with VDGIF. Other alternatives, including no action, will be considered in the hunt program evaluation, and there will be public involvement before making a final decision.

Objective 2.3 Recreational Fishing

Provide a quality recreational fishing opportunity at designated refuge sites.

Rationale
The Refuge Improvement Act identifies fishing as priority wildlife-dependent recreation for refuges. Fishing provides an opportunity for the Service to promote an understanding and appreciation of natural resources and their management in the Potomac River and Chesapeake Bay ecosystems and on all lands and waters in the Refuge System.

We will facilitate fishing at designated sites, in partnership with VDGIF, assuming access and staffing are secured to manage the program. Map 4.3 depicts where up to four fishing sites will be developed and designated, assuming no impacts to cultural resources or sensitive wildlife areas are predicted.

Increasing the use, enjoyment, and visibility of the refuge will allow us to better communicate the refuge's importance to wildlife and habitat. In turn, we hope this increases support for the Refuge System and promotes stewardship of natural resources in the local community and region.

Strategies
Over the 15 years of CCP implementation
- Once additional staff are in place, complete administrative requirements to open the refuge to fishing.

- Develop up to four designated fishing sites (see map 4.3).
- Partner with VDGIF to help manage the recreational fishing program.

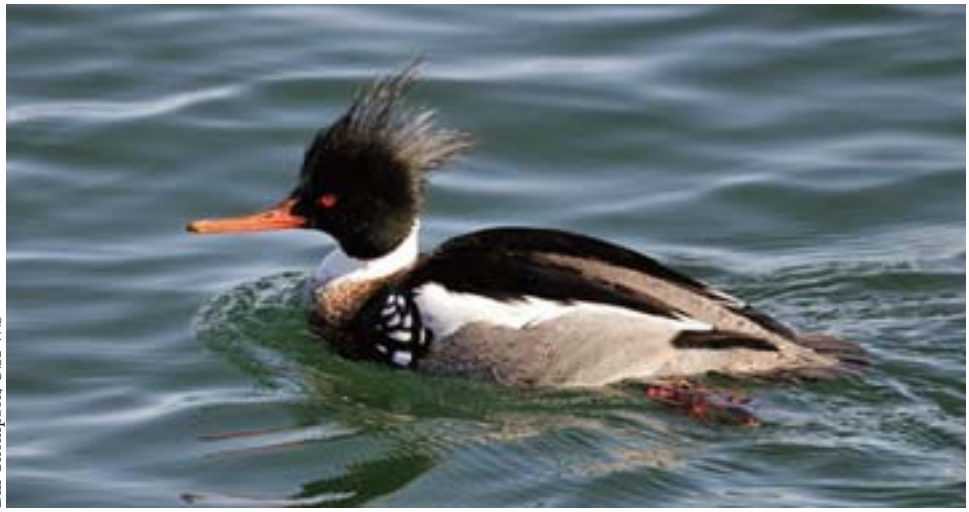
Objective 2.4 Wildlife Observation and Photography

Provide self-guided wildlife observation and photography opportunities at designated locations on the refuge.

Rationale
The Refuge Improvement Act identifies wildlife observation and photography as priority wildlife-dependent recreational activities on refuges. These activities promote the understanding and appreciation of natural resources and their management on all lands and waters in the Refuge System.

Assuming safe public access by land and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we will develop a self-guided wildlife observation and photography program. Our objective will be to promote an understanding of the wildlife and habitat resources of Featherstone Refuge, as well as other refuges in the Refuge Complex. Tentative locations for infrastructure are presented on map 4.3.

Red-breasted merganser



Bill Thompson/USFWS

In an effort to provide wildlife observation and nature photography opportunities in the near term, we will allow non-motorized boat landings on a designated area of Featherstone Refuge's shoreline. The designated landing site is on tidal beach on Farm Creek (refer to map 4.3). Visitors accessing the refuge at this location by non-motorized boat will be allowed to walk approximately 0.4 miles along an existing footpath (indicated on map 4.3). Boaters will be confined to this section of footpath until the rest of the refuge is officially opened to public use, as described under goal 2, objective 2.1 "Public Access." No special infrastructure will be constructed to facilitate non-motorized boat access. We predict no short- or long-term impacts to resources given

- our expectation that less than 200 boat landings per year would occur;
- the landing site location is primarily on tidal sandy beach that is a dynamic, shifting substrate and has very little vegetation or soils that would be impacted;
- none of the vegetation in the area is of conservation concern and people would be required to stay on the existing footpath to minimize additional off-trail impacts; and

- our current knowledge of wildlife inhabiting the area indicates no disturbances to nesting or breeding wildlife would occur.

We will monitor to see if any of these conditions change, or unanticipated impacts are occurring, and would adapt management as warranted. We will also conduct regular outreach and enforcement of refuge regulations to insure minimal to no impacts results.

Strategies
Over the 15 years of CCP implementation

- Continue to pursue discussions with Prince William County on 1.1-mile segment of the PHNST and public access and parking as in objective 2.1 above.

- Assuming public access is secured, pursue staffing (see appendix E) and funding to develop and maintain a self-guided wildlife observation and photography program.

- Seek funding to develop infrastructure as presented on map 4.3, which includes approximately 0.75 miles of trails (in addition to the PHNST) and up to four observation platforms. Trails surfaces would be either dirt or stone dust. Prior to any trail development, we will work with NPS, VNHP, and VDGIF to locate and map any sensitive wildlife or plant areas in proximity to the proposed trail corridors.

- Designate one non-motorized boat landing site on Farm Creek. Brush out footpath to define and designate trail. Post information at site that conveys rules and regulations.

Objective 2.5 Interpretation

Provide informational and interpretive panels at trailheads, or other focal points of visitor activity to facilitate a self-guided experience.

Rationale
The Refuge Improvement Act identifies interpretation as priority wildlife-dependent recreation on refuges. It may include activities, talks, publications, audio-visual media, signs, and exhibits that convey key messages about natural and cultural resources to visitors. Visitors who experience interpretation have the opportunity to make their own connections to the resource leading to possible resource stewardship and the understanding of resource relationships and human impacts.

Similar to objective 2.5, once safe public access and parking is secured, and staffing and funding to construct and maintain infrastructure is in place, we will develop informational and interpretive panels at trailheads to facilitate self-guided opportunities. Occasional interpretive talks and tours will be given upon request.

Another effort underway related to potential interpretative activities on the refuge is the proposed Captain John Smith Chesapeake National Historic Trail. In September 2010, the NPS released a draft Comprehensive Management Plan and EA for the trail for public review and comment. The trail is the first national water-trail and commemorates the explorations of John Smith on the Chesapeake Bay and its tributaries in 1607-1609, tracing approximately 3,000 miles of his voyage routes. The final plan was approved in February 2011.

The NPS is working with many partners to plan, develop, and manage the trail, including other national wildlife refuges in the Chesapeake Bay area. Other partners include the Friends of the Captain John Smith Trail, the Chesapeake Bay Gateways and Watertrails Network, Federal and State agencies, communities, nonprofit organizations, and businesses. The draft plan and EA

outline how the NPS and these partners will develop component water trails, provide access to the trail, interpret the John Smith voyage, and protect the important resources related to the trail. Refuges in the Chesapeake Bay area, including the Potomac River Refuge Complex, have been coordinating with the NPS on identifying compatible opportunities on refuge lands to support this effort. We will continue to coordinate with the NPS on developing opportunities for the trail consistent with the final decision of the CCP.

Strategies
Over the 15 years of CCP implementation
- Continue to pursue discussions with Prince William County on PHNST and public access and parking as in objective 2.1 above.
- Assuming public access is secured, pursue staffing (appendix E) and funding to develop and maintain a limited self-guided interpretive program.
- Encourage trained volunteers, Friends Group members, and partners to conduct interpretive walks and related programs.
- Coordinate with the NPS to identify opportunities to interpret the Captain John Smith Chesapeake National Historic Trail on the refuge, such as placing interpretative panels at strategic locations.

Objective 2.6 Environmental Education

Support partner-led environmental educational opportunities upon request.

Rationale
The Refuge Improvement Act identifies environmental education as a priority wildlife-dependent recreational activity on refuges. Visitors will benefit from environmental education opportunities on the refuge. These activities will promote understanding and appreciation of natural resources and their management and will help to raise awareness, understanding, and appreciation of the role of the refuge in the tidal Potomac River and Chesapeake Bay watershed and its contribution to migratory bird conservation. We will support partner-led efforts to design and implement an environmental education program. That program could include teacher-training or onsite student programs.

Strategies
Over the 15 years of CCP implementation
- Continue to pursue discussions with Prince William County on PHNST and public access and parking as in objective 2.1 above.
- Assuming safe public access is secured, encourage partners to lead quality environmental educational programs, operating under a special use permit.

GOAL 3: **Promote awareness, understanding, and support of the values of the refuge, the resources of the Chesapeake Bay watershed, and the mission of the National Wildlife Refuge System.**

Objective 3.1 Volunteers

Provide volunteer opportunities to facilitate public use and wildlife and habitat management programs.

Rationale
We benefit from volunteer support of programs on the refuge. Volunteer projects also can be an effective outreach tool to increase awareness and understanding of local and regional resource concerns.

Strategies
Over the 15 years of CCP implementation
- Develop a list of volunteer opportunities and recruit for projects as needed

Objective 3.2 Community Outreach

Conduct outreach to inform the local community about programs or activities.

Rationale
Because there is no authorized public access, except as noted under objective 2.4, we strive to find alternative ways to educate the public about Featherstone Refuge, and keep the local community informed about its values to wildlife and habitat resources, other than using onsite programs. We will continue to develop and pursue community outreach activities, which promote natural resource stewardship, and raise awareness of the Refuge System, the Refuge Complex, and this refuge's contribution to maintaining natural resources in the region.

Strategies
Continue to
- Inform visitors at other units of the Refuge Complex and local residents about Featherstone Refuge and its resources through the media, interpretive materials available at Occoquan Bay Refuge visitor contact facility, and our Web site.

- Issue news releases to local and regional print and electronic media when newsworthy events occur, to announce scheduled activities, and to keep the public informed about refuge management activities.

- Respond in a timely manner to written, telephoned, or in-person inquiries from the public.

Over the 15 years of CCP implementation
- Increase communication and outreach efforts, when needed, to enhance community relations

Objective 3.3 Elected Official Outreach

Conduct outreach to elected officials to explain management priorities or highlight management issues and challenges.

Rationale
We seek support from elected officials for all our Refuge Complex programs. It is important to keep them apprised, especially when significant new programs are implemented. Also, as issues arise, it is important to provide updates and explain how the issues are being addressed.

Strategies
Continue to
- Provide written or personal briefings for members of Congress or their staffs, as needed or as requested, to inform them about important events or about issues affecting the refuge.

Over the 15 years of CCP implementation
- Enhance outreach to Federal, State, and local officials.

Objective 3.4 Research

Facilitate research, monitoring, and inventory opportunities that will enhance science-based decisionmaking and adaptive management.

Rationale
We will encourage partner-led research that would increase our understanding of wildlife and habitats at Featherstone Refuge, or that would contribute to addressing issues of regional concern to the Service and the State.

Strategies
Over the 15 years of CCP implementation
- Identify and prioritize research and monitoring needs for the refuge

- Encourage partners to conduct research and assist them in seeking alternative funding sources